

**Southern California Priority Corridor  
Showcase Program Evaluation**

**Los Angeles/Ventura  
Advanced Traveler Information System  
(ATIS)  
Evaluation Report**

**FINAL**

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## **Disclaimer**

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California, Caltrans, MTA or the U.S. Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

## Abbreviations & Acronyms

<b>ATIS</b>	Advanced Traveler Information System
<b>ATMS</b>	Advanced Transportation Management System
<b>AVL</b>	Automatic Vehicle Location
<b>Caltrans</b>	California Department of Transportation
<b>CCTV</b>	Closed-circuit Television surveillance camera
<b>CM</b>	Configuration Management
<b>CMP</b>	Configuration Management Plan
<b>CMS</b>	Changeable Message Sign
<b>CORBA</b>	Common Object Request Broker Architecture
<b>COTS</b>	Commercial Off-the-Shelf
<b>CTC</b>	California Transportation Commission
<b>CVO</b>	Commercial Vehicle Operations
<b>CW</b>	Corridor-wide
<b>CWATIS</b>	Corridor-wide Advanced Traveler Information System Project
<b>CWATMS</b>	Corridor-wide Advanced Transportation Management System Project
<b>CWCVO</b>	Corridor-wide Commercial Vehicle Operations Project
<b>CWSIP</b>	Corridor-wide Systems Integration Project
<b>CWSPP</b>	Corridor-wide Strategic Planning Project
<b>DOIT</b>	California Department of Information Technology
<b>DRI</b>	Caltrans, Division of Research & Innovation (formerly NTR)
<b>EAP</b>	Evaluation Activity Plan
<b>EP</b>	Evaluation Plan
<b>FHWA</b>	Federal Highway Administration
<b>FSR</b>	Feasibility Study Report
<b>FTA</b>	Federal Transit Administration
<b>FTE</b>	Full-Time Equivalent (one full-time employee)
<b>GPRA</b>	Government Performance and Results Act
<b>GUI</b>	Graphical User Interface
<b>HAR</b>	Highway Advisory Radio
<b>HP</b>	Hewlett-Packard
<b>HQIT</b>	Headquarters - Information Technology (division of Caltrans)
<b>IDL</b>	Interface Definition Language
<b>IPR</b>	Intellectual Property Rights
<b>ISP</b>	Information Service Provider
<b>ISSC</b>	Information Systems Service Center (division of Caltrans)
<b>ISTEA</b>	Intermodal Surface Transportation Efficiency Act (of 1991)
<b>ITS</b>	Intelligent Transportation Systems (formerly IVHS)
<b>IVHS</b>	Intelligent Vehicle Highway Systems (now ITS)
<b>LACDPW</b>	Los Angeles County Department of Public Works
<b>LADOT</b>	City of Los Angeles Department of Transportation
<b>LAN</b>	Local Area Network
<b>MOU</b>	Memorandum of Understanding
<b>MPO</b>	Metropolitan Planning Organization

<b>MTA</b>	Los Angeles County Metropolitan Transportation Authority
<b>MTBF</b>	Mean Time Between Failure
<b>NDA</b>	Non-Disclosure Agreement
<b>NET</b>	National Engineering Technology Corporation
<b>NTCIP</b>	National Transportation Communications for ITS Protocol
<b>NTR</b>	Caltrans, Division of New Technology & Research (now DRI)
<b>OCTA</b>	Orange County Transportation Authority
<b>O&amp;M</b>	Operations and Maintenance
<b>OS</b>	Operating system (such as Windows™, Unix, Linux, et. al.)
<b>PC</b>	Personal Computer (Windows™-based)
<b>RCTC</b>	Riverside County Transportation Commission
<b>RFP</b>	Request for Proposals
<b>RTP</b>	Regional Transportation Plan
<b>RTPA</b>	Regional Transportation Planning Agency
<b>RWS</b>	Remote Workstation
<b>SANBAG</b>	San Bernardino Association of Governments
<b>SANDAG</b>	San Diego Association of Governments
<b>SCAG</b>	Southern California Association of Governments
<b>SCAQMD</b>	South Coast Air Quality Management District
<b>SCPCSC</b>	Southern California Priority Corridor Steering Committee
<b>SIP</b>	Systems Integration Plan
<b>TEA-21</b>	Transportation Equity Act for the 21st Century
<b>TMC</b>	Transportation Management Center
<b>USDOT</b>	United States Department of Transportation
<b>VDS</b>	Vehicle Detector Station
<b>VOS</b>	Volume/Occupancy/Speed
<b>VCTC</b>	Ventura County Transportation Commission
<b>WAN</b>	Wide Area Network
<b>XML</b>	Extensible Markup Language

## **Executive Summary**

### ***Background***

As required by federal law, all Intelligent Transportation System (ITS) projects that receive federal funding must undergo an evaluation to help assess the costs and benefits of ITS. This document is one of 23 reports produced as part of the Southern California ITS Priority Corridor Showcase Program Evaluation to help planners and decision-makers at the federal, state and local levels make better-informed decisions regarding future ITS deployments. This report presents the experiences, costs, and lessons learned from Southern California's LA/Ventura ATIS project.

In 1993, the U.S. Department of Transportation designated Southern California as one of four Priority Corridors in which ITS could have particular benefit. Southern California suffers from extreme traffic congestion, limited room for expanding transportation facilities, and above-average air pollution levels. The Southern California Priority Corridor is one of the most populated, traveled, and visited regions in the country, and consists of four adjoining regions:

- ▶ Los Angeles/Ventura
- ▶ Orange County
- ▶ San Diego County
- ▶ Inland Empire (San Bernardino and Riverside Counties).

The ITS Showcase Program is one of several programs that have been implemented in Southern California's Priority Corridor to help aid mobility and mitigate traffic congestion and its associated environmental impacts. The Showcase Program consists of 17 ITS projects that collectively form a corridor-wide intermodal transportation management and information network between Los Angeles, Orange County, San Diego, and the Inland Empire. Each Showcase project deploys a piece of this corridor-wide ITS network, including regional Advanced Traveler Information Systems (ATIS), regional Advanced Transportation Management Systems (ATMS), and regional and interregional communications infrastructure. Eleven of the projects are regional in nature, while the remaining six are corridor-wide. LA/Ventura ATIS is one of several federally funded Showcase Projects in Southern California, as identified in the Southern California ITS Priority Corridor Strategic Deployment Plan.

LA/Ventura ATIS is an acronym for Los Angeles/Ventura Counties Regional Advanced Traveler Information System (ATIS), which is intended to provide the region's travelers with a baseline level of "reliable, relevant, and timely information." Initial deployment of an Advanced Traveler Information System in the two-county region is based on a public-private partnership and is facilitated through a market-driven multi-modal ATIS network.

The LA/Ventura ATIS system is designed to allow all traveler groups the opportunity to minimize trip delays by delivering accurate on-demand, real-time information on traffic conditions. By having access to up-to-the-minute traffic conditions, travelers can adjust travel routes, modify departure times and consider alternative modes of transportation to gain travel-time savings. The deployment of such traveler information systems could positively impact safety and efficiency in the transportation system. However, more empirical research needs to be performed to understand the cumulative impacts on Vehicle Miles of Travel (VMT) and travel time savings regionwide. A detailed discussion of the complexity of disentangling the cumulative impacts of traveler information systems of regional travel is discussed in Chapter 7.

In the Los Angeles/Ventura Counties region, ATIS information is derived from a wide variety of separate agency sources. The challenge of LA/Ventura ATIS is to convert these data into useable information that can be packaged into services that enable pre-trip planning, en-route information, and route guidance for both individual travelers and freight shippers. The LA/Ventura Business Plan identifies wider dissemination and use of traveler information through the creation of a single point connection for Information Service Providers (ISPs) to access traveler information data sources in a standardized format. By simplifying the access to data, project sponsors anticipate that LA/Ventura ATIS will attract additional partners, thereby expanding access to traveler information throughout the region.

### ***Evaluation Findings, Conclusions, and Recommendations***

LA/Ventura ATIS brings Los Angeles and Ventura County another critical element towards the achievement of an integrated ITS. The principle benefit of LA/Ventura ATIS is the consolidation of real-time traveler information from a variety of separate agencies into a single point-of-access for end users, which include the traveling public, public agencies and ISPs. LA/Ventura ATIS is the second system to be fully compliant with the corridor's Showcase Architecture, and it is among the first Showcase projects to successfully integrate control centers and dispatch centers with the interregional Showcase Network. The business model for LA/Ventura ATIS is pathbreaking because it is one of the first Showcase project deployments to explore the long-term viability of a public/private partnership. To gain an understanding of the implications of a public/private partnership on the long-term sustainability of LA/Ventura ATIS, the Los Angeles County Metropolitan Transportation Authority (MTA) created a Blue Ribbon Panel to discuss the objectives, benefits and risks associated with various public/private partnership deployment alternatives (see Appendix A).

At this time, LA/Ventura ATIS has successfully converted data from disparate host management systems into a common Showcase data communications format in accordance with all functional requirements. Through a "legacy bridge," Advanced Transportation Management System (ATMS) data such as incident details, construction activity, planned lane closures, real-time congestion data, Closed Circuit Television (CCTV) status, and CMS sign status are extracted from the ATMS traffic and events database tables and placed on the regional network as "Showcase-Managed Objects."

The content and format of this data is standardized according to an Interface Definition Language (IDL) that defines Showcase data objects. LA/Ventura ATIS is also functionally capable of processing transit bus AVL data in order to provide traffic signal priority along certain arterials, but full use of this feature is pending the AVL system installation (MTA is currently developing the AVL functionality as part of the Advanced Transit Management System (ATMS) ).

The fixed-price LA/Ventura ATIS contract initially specified an 18-month period of performance, but the period of performance was extended well beyond the originally anticipated project schedule. LA/Ventura ATIS's software implementation, integration and testing were performed over a 36-month period with a significant amount of interagency coordination, consensus building, and system planning that accompanied these activities. Also, the extension of the period of performance was driven in part by a contract amendment that facilitated the Blue Ribbon Panel review effort.

The two engineering documents that required the most effort were the User Requirements and Systems Requirements documents. Each of these documents required about six months of consensus building, preparation, review, discussion, and revision to complete. Future ITS projects might benefit from initiatives that make review and finalization of such documents more time-efficient. Such initiatives might include:

1. Approaching the system development in "baby steps." Only include the most critical system requirements in the Requirements document, and leave less critical "wish list" items to future builds of the system.
2. Developing and using formal document review procedures that define the manner and format in which comments/issues will be received, processed, and resolved.
3. Strictly limiting the amount of time to read and review a document to two weeks, and gaining stakeholder commitment to maintain the schedule.
4. Making formal oral presentations of major documents to stakeholders in order to gather direct feedback and respond to stakeholder concerns.
5. Dictate drafts of major documents onto tape or CD and circulate them as "books-on-tape" so that they are more convenient to carry and review while traveling, commuting, etc.

Despite several substantial postponements of key milestones, the extended period of performance did not materially result in a final project budget that exceeded the initial cost estimate. Nonetheless, future ITS projects might benefit from a phased or task order-oriented approach that would permit a re-evaluation of the project's progress and costs after each systems engineering step. This approach would aid in estimating project cost and duration, and would relieve some of the financial risk imposed on contractors by fixed-price agreements. It should be noted that the software vendor has worked closely



with MTA to disclose unanticipated development issues, and taken on an active role in shepherding the project through the process.

In eight weeks of observed system operation, there has been no evidence of any major system failures. However, it must be noted that while the Integrated Workstation is functional and accessible to users through the MTA website ([www.mta.net](http://www.mta.net)), the system remains under-utilized pending decisions regarding the long-term ownership of the system and how operating and maintenance costs of the LA/Ventura ATIS system should be shared among partner agencies. While there was much anticipation regarding the ability of LA/Ventura ATIS to attract private sector interest, several institutional challenges must be addressed in order to mitigate the financial risks associated with retaining long-term ownership of the data consolidator.

1. How will financial risks to the Core Public Partner be mitigated?
2. How will operating and maintenance costs be shared among partner agencies in the event private ISPs do not subscribe for ATIS services to the extent anticipated?
3. What criteria should be used to determine whether ATIS should be operated and maintained by a sponsor agency or contracted to a third-party ATIS service?
4. What are the long term operating and maintenance costs of LA/Ventura ATIS under competing business framework alternatives?
5. Given the plethora of traveler information systems available both online and through conventional media outlets, how should LA/Ventura ATIS be marketed to distinguish its unique services from other advanced traveler information systems currently in the marketplace?

Training on system operation and maintenance was provided to agency staff during the final phase of the project, but the reluctance among ISPs to support subscription-based services and long term concerns regarding the responsibility for ongoing maintenance and operations has left the integrated workstations at MTA and Caltrans largely unstaffed. Both agencies, however, have committed staff resources to ensure that the system continues to be fully functional, pending the resolution to the aforementioned ownership, deployment and cost issues.

Although the LA/Ventura ATIS system was successfully completed and tested, it has yet to be fully deployed. Therefore, a comprehensive analysis of LA/Ventura ATIS's impacts to the transportation system could not be performed, due in part to the impact of several practical considerations on the basic principles articulated in the initial business plan. Originally, it was anticipated that operations and maintenance costs would be funded through lease agreements with private sector Information Service Providers (ISPs). However, the harsh economic conditions and the increasingly competitive market

for traveler information caused sponsors to reconsider the long-term feasibility of a public/private partnership.

In May 2003, MTA sponsored a Blue Ribbon Committee to address the issue of ownership and operation of LA/Ventura ATIS, given the reluctance among private ISPs to pay for traveler information that they currently obtain free-of-charge through a variety of web-based traveler information portals. The long-term viability of the LA/Ventura ATIS Business Plan, which originally adopted a public/private partnership model in the procurement, will depend in large part on how ongoing communications, operations and maintenance costs will be shared among project sponsors and how LA/Ventura ATIS will fit within the context of a regional ITS system that serves as a platform for disseminating traveler information to the public via web-based, telephone and other wireless services.

# 1 Introduction

## 1.1 Purpose and Scope of this Report

As required by federal law<sup>1</sup>, all Intelligent Transportation System (ITS) projects that receive federal funding must undergo an evaluation to help assess the costs and benefits of ITS. The information provided in this report is intended to help planners and decision-makers at the federal, state and local levels make better-informed decisions regarding future ITS deployments based on the experiences of Southern California's LA/Ventura Advanced Traveler Information System (ATIS) project.

This document is one of 23 reports produced as part of the Southern California ITS Priority Corridor Showcase Program Evaluation, and covers only the events and findings resulting from the LA/Ventura ATIS evaluation. The complete set of findings from the Showcase Program Evaluation are found in the following collection of documents:

Document Type/Title	Date	Document Number
<b>17 Individual Project Evaluation Reports</b>		
Corridor-wide ATIS Project Report	7/16/2003	65A0030/0033
Corridor-wide ATMS Project Report	TBD	
Corridor-wide CVO Project Report	TBD	
Corridor-wide Rideshare Project Report	TBD	
Corridor-wide Strategic Planning Project Report	10/29/2002	65A0030/0028
Fontana-Ontario ATMIS Project Report	TBD	
IMAJINE Project Report	3/17/2003	65A0030/0029
IMTMC Project Report	TBD	
InterCAD Project Report	4/2/2003	65A0030/0030
Kernel Project Report	5/30/2003	65A0030/0031
<b>LA ATIS Project Report</b>	<b>3/15/2004</b>	<b>65A0030/0038</b>
Mission Valley ATMIS Project Report	TBD	
Mode Shift Project Report	TBD	
OCMDI Project Report	2/20/2004	65A0030/0040
Traffic Signal Integration Project Report	TBD	
Transit Mgt System Project Report	TBD	
TravelTIP Project Report	2/16/2004	65A0030/0036
<b>5 Cross-Cutting Evaluation Reports</b>		
System Performance Cross-Cutting Report	TBD	
Costs Cross-Cutting Report	TBD	
Institutional Issues Cross-Cutting Report	TBD	
Information Management Cross-Cutting Report	TBD	
Transportation System Impacts Cross-Cutting Report	TBD	
<b>Final Summary Evaluation Report</b>		
Showcase Program Evaluation Summary Report	TBD	

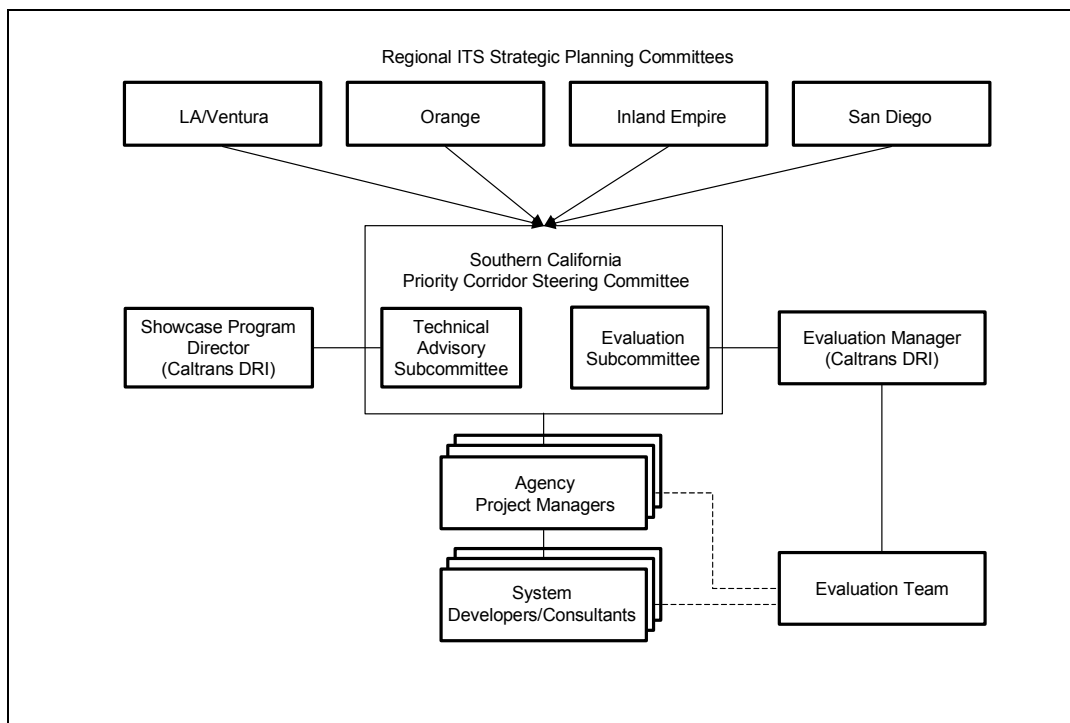
"TBD" indicates a future deliverable that is not yet available.

## 1.2 Evaluation Design and Approach

The findings outlined in this report are based on over four years of direct observations at project meetings, reviews of released project documents and agency memos, as well as formal and informal interviews and discussions with project partners.

The evaluation is responsive to the needs and suggestions of the Priority Corridor's Evaluation Subcommittee, which reports to the Priority Corridor's Steering Committee. As shown in Exhibit 1, both committees are comprised of stakeholders from the federal, state, and local levels.

**Exhibit 1 – Management Structure and Organization of the Showcase Program**



The Steering Committee's member agencies include:

- ▶ California Highway Patrol (CHP)
- ▶ Caltrans, Division of Traffic Operations (headquarters)\*
- ▶ Caltrans, District 7\*
- ▶ Caltrans, District 8\*
- ▶ Caltrans, District 11\*
- ▶ Caltrans, District 12
- ▶ City of Irvine\*
- ▶ City of Los Angeles Department of Transportation (LADOT)
- ▶ City of San Diego
- ▶ Federal Highway Administration (FHWA)\*
- ▶ Federal Transit Administration (FTA)
- ▶ Los Angeles County Metropolitan Transportation Authority (LACMTA)

- ▶ Orange County Transportation Authority (OCTA)
- ▶ Riverside County Transportation Commission (RCTC)
- ▶ San Bernardino Association of Governments (SANBAG)
- ▶ San Diego Association of Governments (SANDAG)
- ▶ South Coast Air Quality Management District (SCAQMD)
- ▶ Southern California Association of Governments (SCAG).

\* Indicates an Evaluation Subcommittee member

The Showcase Program's Evaluation Design is based on a set of evaluation Goals and supporting Objectives and Measures that were developed by the Evaluation Team in partnership with federal, state and local stakeholders, and documented in the "Showcase Program Evaluation Approach" in 1998. Each individual Showcase project is evaluated based on an applicable subset of these Goals, Objectives, and Measures in order to help ensure that summary evaluation results can be aggregated from across the multiple Showcase project evaluations. The Showcase Program's five evaluation Goals include:

- ▶ Evaluate System Performance
- ▶ Evaluate Costs
- ▶ Evaluate Institutional Issues and Impacts
- ▶ Evaluate the Use and Management of Transportation/Traveler Information
- ▶ Explore Potential Impacts on Travel Behavior

As LA/Ventura ATIS evolved, project-specific refinements to the evaluation design were documented in a high-level Evaluation Plan (EP) and a detailed Evaluation Activity Plan (EAP). In general, the EP describes the project and/or system under evaluation, and lays the foundation for further evaluation activities by developing consensus among the Evaluation Subcommittee and project partners as to which of Showcase's evaluation Goals, Objectives, and Measures best apply to the project.

As the project matured, and after the EP had been approved, an EAP was developed to plan, schedule, and describe specific activities (e.g., interviews, surveys) and step-by-step procedures for conducting the evaluation. Data collection began after both plans had been reviewed and subsequently approved by the Evaluation Subcommittee and the project's partners.

### **1.3 Organization of this Report**

The LA/Ventura ATIS Evaluation Report provides a background description of the Southern California Priority Corridor and the transportation challenges facing Los Angeles County. This is followed by descriptions of the Showcase Program and the LA/Ventura ATIS project, including a detailed technical description. The evaluation itself is subdivided and ordered into the five topic areas described below:

*System Performance* — provides important benchmark information regarding system availability, reliability, scalability and compatibility. The evaluation quantifies those items and could be used to identify needed improvements and help develop specifications for future systems.

*Cost* — provides important benchmark information regarding funding sources, software licensing, development costs, costs to re-deploy elsewhere or expand the system, and operations and maintenance (O&M) costs. This report includes an estimate of how much it might cost to re-deploy ATIS "from scratch" elsewhere in the State, and also looks at the incremental costs for integrating additional partner agencies and/or traveler information kiosks into the existing system.

*Institutional Impacts* — provides important information regarding the administrative, procedural and legal impacts resulting from the deployment of LA/Ventura ATIS. Such impacts include changes in operator workloads, responsibilities and job turnover rates, as well as changes and limitations of agency-wide policies, procedures and guidelines.

*Transportation & Traveler Information Management* — provides important benchmark information on system usage and user acceptance (by both agency operators and the general public). This report provides both quantitative and qualitative findings on those items and can be used to identify user demand, needed improvements and potential areas of future growth.

*Transportation System Impacts* — provides analysis of LA/Ventura ATIS' potential impacts on transit usage, traffic congestion, air quality, and traffic safety.

The report concludes with a summary, final remarks and recommendations for next steps. Several appendices contain supporting documentation such as technical designs and copies of evaluation data collection instruments (blank questionnaires and survey).

### **1.4 Privacy Considerations**

Some of the information acquired in the interview and discussion process could be considered sensitive and has been characterized in this report without attribution. The Evaluation Team has taken precautions to safeguard responses and maintain their confidentiality. Wherever possible, interview responses have been aggregated during analysis such that individual responses have

become part of a larger aggregate response. The names of individuals and directly attributable quotes have not been used in this document unless the person has reviewed and expressly consented to its use.

## ***1.5 Constraints & Assumptions***

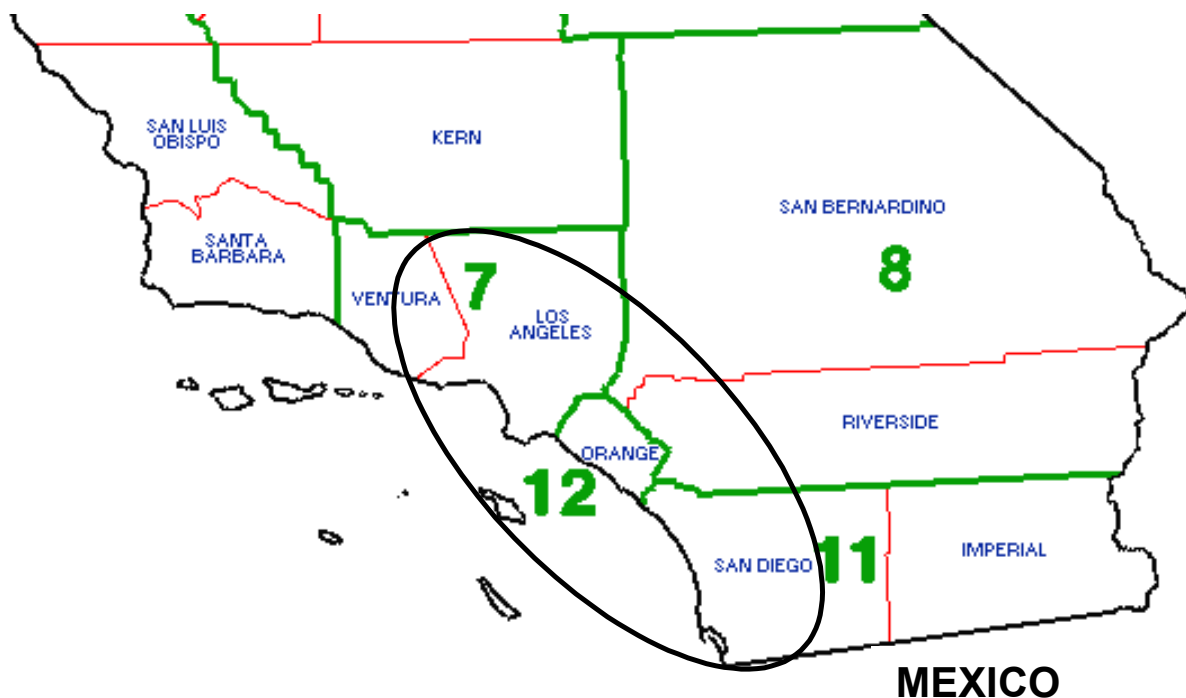
The LA/Ventura ATIS evaluation is subject to the following constraints and assumptions:

- ▶ The project's consultant was not required to disclose actual project expenses, so the project's cost is based on the fixed-price budget stipulated in the LA/Ventura ATIS contract and its amendments. The budget reflects the expenses and costs for services paid by the client agency, but not necessarily the actual detailed costs for goods and services borne by the contractor.

## ***1.6 Project Background***

### ***1.6.1 The Southern California Priority Corridor***

In 1993, the U.S. Department of Transportation designated Southern California as one of four Priority Corridors in which Intelligent Transportation Systems (ITS) could have particular benefit. Southern California suffers from extreme traffic congestion, limited room for expanding transportation facilities, and above-average air pollution levels. The Southern California Priority Corridor, illustrated in Exhibit 2, is one of the most populated, traveled, and visited regions in the country.

**Exhibit 2 – The Southern California Priority Corridor and Vicinity**

The Southern California Priority Corridor consists of four distinct regions that correspond with the four Southern California Caltrans districts:

- ▶ Los Angeles/Ventura (Caltrans District 7)
- ▶ Orange County (Caltrans District 12)
- ▶ San Diego County (Caltrans District 11)
- ▶ Inland Empire (Caltrans District 8).

Roughly two-thirds of the state's population – about 20 million people – resides in or around the Southern California Priority Corridor.

**Exhibit 3 – Population and Number of Registered Vehicles by County**

<b>County</b>	<b>Population<sup>2</sup> (as of 7/1/2001)</b>	<b>Registered Vehicles<sup>3*</sup> (as of 12/31/2000)</b>	<b>Caltrans District</b>
Los Angeles	9.7 million	6.2 million	7
Orange	2.9 million	2.1 million	12
San Diego	2.9 million	2.1 million	11
San Bernardino	1.8 million	1.1 million	8
Riverside	1.6 million	1.1 million	8
Ventura	0.8 million	0.6 million	7
Imperial	0.15 million	0.1 million	11
<b>Total</b>	<b>19.85 million</b>	<b>12.7 million</b>	

\*Includes autos, trucks, and motorcycles. Trailers not included.



### 1.6.2 The Southern California Priority Corridor's ITS Showcase Program

The ITS Showcase Program is one of several programs that have been implemented in Southern California's Priority Corridor to help aid mobility and mitigate traffic congestion and its associated environmental impacts.

The Southern California ITS Showcase Program consists of 17 individual ITS projects that collectively form a corridor-wide intermodal transportation management and information network between Los Angeles, Orange County, San Diego, and the Inland Empire. Eleven of the projects are regional in nature, while the remaining six are corridor-wide in scope. Los Angeles County's LA/Ventura project is one of the eleven regional projects.

The 17 Showcase projects are listed by region in Exhibit 4. Eight of the projects, including LA/Ventura ATIS, were fast-tracked and designated "Early Start" projects because of their importance as base infrastructure and potential to act as role models for the rest of the Showcase Program.

**Exhibit 4 – The 17 Showcase Projects and their Status as of February 2004**

<b>Project</b>	<b>RFP Issued</b>	<b>Contractor Selected</b>	<b>Contract Executed</b>	<b>Project Underway</b>	<b>Project Complete</b>
<b>Corridor-wide</b>					
Scoping & High Level Design (Kernel)*	✓	✓	✓	✓	✓
Strategic Planning/Systems Integration	✓	✓	✓	✓	✓
CVO					
ATIS	✓	✓	✓	✓	✓
ATMS					
Rideshare	✓	✓	✓	✓	✓
<b>Los Angeles Region</b>					
IMAJINE*	✓	✓	✓	✓	✓
Mode Shift*	✓	✓	✓	✓	✓
LA/Ventura ATIS	✓	✓	✓	✓	✓
<b>Inland Empire Region</b>					
Fontana-Ontario ATMIS	✓	✓	✓	✓	✓
<b>Orange County Region</b>					
TravelTIP*	✓	✓	✓	✓	✓
OCMDI	✓	✓	✓	✓	✓
<b>San Diego Region</b>					
InterCAD*	✓	✓	✓	✓	✓
Mission Valley ATMIS*	✓	✓	✓	✓	✓
IMTMS/C (ATMSi)*	✓	✓	✓	✓	
Traffic Signal Integration (RAMS)	✓	✓	✓	✓	
Transit Management System*	✓	✓	✓	✓	

\* Indicates an "Early Start" project.

☐ CWCVO and CWATMS do not yet have approved workplans.

## **2 Project/System Technical Description**

LA/Ventura ATIS is an acronym for Los Angeles and Ventura County Advanced Traveler Information System. The system enables end users to have real-time access to Advanced Transportation Management System (ATMS) data such as real-time congestion data (volumes, occupancies or estimated speed), incident details, construction activity and resulting lane closures, CCTV status, and CMS sign status. The content and format of this data is standardized according to an Interface Definition Language (IDL) that defines the Showcase data objects.

Different projects within the Showcase umbrella are responsible for developing their own domain-specific IDLs. For Caltrans, the ATMS seed and IDL are being developed under the auspices of the Caltrans Mode Shift project, which is external to the LA/Ventura ATIS. The end result of this process is a consistent data format going into a public sector data collection point. The main function of the ATIS server is to collect and reformat the transportation domain data into a form suitable for use in the traffic ISP market.

The targeted beneficiaries of LA/Ventura ATIS include public agencies, private media outlets as well as the traveling public. Public agencies, particularly cities that operate Transportation Management Centers (TMCs), can access real-time travel information provided through LA/Ventura ATIS to better manage traffic, coordinate traffic management strategies with other jurisdictions, and disseminate information to the public through variable message signs, highway advisory radio (HAR), kiosks, web pages, and other information portals. Other agencies such as transit operators, Caltrans and the California Highway Patrol (CHP) are expected to use real-time traveler information to operate individual systems more efficiently and keep the end users better informed about current traffic conditions. The intended end users include the traveling public making trips using both commercial and non-commercial vehicles. The data items furnished by LA/Ventura ATIS partners are summarized in Exhibit 5.

**Exhibit 5 – Summary of LA/Ventura ATIS Partners, Data Availability and Dissemination Devices Used in the LA/Ventura Region**

Agency	Data Available	Dissemination Devices in Use	Existing Inter-ties
Amtrak	Train arrival status at stations Train schedules	Web – <a href="http://www.Amtrak.com">www.Amtrak.com</a> Phone – 1-800-872-7245 CMS @ Union Station	None
Caltrans	Static Data – Planned Lane Closure Information Route/Information Day/Time Start/End Time Start/end Points Dynamic Data Raw Detector Data Volume, Occupancy, Speed Average Values for Each Detector Station – Volume, Occupancy, Speed CMS Status/Message CCTV Image Incident Data – Location, Time, Type, Duration, Blockage	Web – <a href="http://www.dot.ca.gov/dist07">www.dot.ca.gov/dist07</a> HAR CMS Kiosks Cable TV BCST Media Auto Faxing	City of Los Angeles City of Pasadena MTA South Gate Access Services
CHP	Incident Data (Location, Time, Type, Duration, Blockage, Units on Scene). FSP as probes (future)	WEB – <a href="http://www.cad.chp.ca.gov">www.cad.chp.ca.gov</a> FIRST Media Ports	40+ Media Users FSP @ D7 TMC
Foothill Transit	Schedules and routes	Web – <a href="http://www.foothilltransit.org">www.foothilltransit.org</a>	None
LACDPW	Currently – none Future – Detector data – volume, occupancy, speed CMS Status/Message CCTV Image	None CMS	None D7 TMC (future)
LACMTA	Schedules and Routes of Buses and Trains operator by MTA and other carriers Trip Planner IMAJINE Future – MetroRapid? Future – ATMS?	Web – <a href="http://www.mta.net/metro/timtables">www.mta.net/metro/timtables</a> Paper schedules Phone – 1-800-COMMUTE Web – <a href="http://www.mta.net">www.mta.net</a>	SCAG
City of Los Angeles	Detector Data – Volume, Occupancy, Speed CMS Status/Message CCTV Image	CMS	Caltrans
Ports of Long Beach & Los Angeles	Current – None Future – Train arrival and clearance times for various segments of the roadway	None	None
Long Beach Transit	Schedules and routes	Phone – 1-562-591-2301 Paper – Routes and Schedule Pamphlets	None

Agency	Data Available	Dissemination Devices in Use	Existing Inter-ties
Metrolink	Train arrival times at different blocks Train load Train schedule	Web – <a href="http://www.metrolinktrains.com">www.metrolinktrains.com</a> Phone – 1-808-5465 also Fax back info. Paper schedules CMS @ Union Station Passenger Info System	None
Santa Monica Big Blue Bus	Schedules and routes	Phone – 1-310-452-5444 Paper – Routes and Schedule Pamphlets	None
SCAG	Transit Schedules for all transit operators in Los Angeles and Ventura Counties Location of Park & Ride Lots Ridesharing information (participant name, route, schedule) Trip planner	Web – <a href="http://www.scag.ca.gov/transit">www.scag.ca.gov/transit</a> Phone – 1-800-COMMUTE TranStar	LACMTA
Torrance Transit	Schedules and routes Real-time arrival and departure (future)	Phone – 1-310-618-6266 Paper – Routes and Schedule Pamphlets	None
VCTC	Schedules and routes Bicycles Ridesharing Park & Ride Airport Service Providers Links to Greyhound, Amtrak, and Metrolink Traffic via links to Caltrans, map and current conditions Emergency incidents via link to CHP CAD	1-800-438-1112 Printed Media Web – <a href="http://www.goventura.org">www.goventura.org</a>	None

LA/Ventura ATIS's partner agencies represent a diverse cross-section in terms of ITS experience and the extensive ITS infrastructure in place prior to LA/Ventura ATIS. Caltrans District 7 has been active in ITS for many years and has in place a state-of-the-art Advanced Transportation Management System (ATMS) that provides a large set of transportation data to the LA/Ventura ATIS system. MTA has also been an active player in regional ITS efforts, and serves as the project sponsor for LA/Ventura ATIS. MTA provides transit schedule data to the LA/Ventura ATIS. Los Angeles County Department of Public Works (LACDPW) is not providing any data to the LA/Ventura ATIS system currently. However, LACDPW is implementing its own Information Exchange Network (IEN) project, which integrates and coordinates the traffic signal systems of various cities throughout Los Angeles County. Once completed, the IEN will become a significant source of data regarding arterial traffic conditions throughout the county. The Los Angeles Department of Transportation (LADOT) is providing arterial congestion data for approximately 4000 signals. This diversity in legacy systems has added some complexity (and

cost) to the LA/Ventura ATIS implementation insofar as some customization was required for each partner in order to successfully integrate all the systems.

### **Project Design Concept**

Each of four Congressionally-designated Priority Corridors received federal funds to develop strategic plans for the deployment of Intelligent Transportation Systems (ITS) technologies that fit into a ‘national’ architecture intended to integrate systems and allow for seamless exchange of information. Several partners – the California Department of Transportation (Caltrans), California Highway Patrol (CHP), City of Los Angeles Department of Transportation (LADOT), Los Angeles County Bus Operators Subcommittee (BOS), Los Angeles County Department of Public Works (LACDPW), Los Angeles County Metropolitan Transportation Authority (MTA), Southern California Air Quality Management District (SCAQMD), Southern California Association of Governments (SCAG), and Ventura County Transportation Commission (VCTC) – have worked in partnership to develop an ITS Strategic Deployment Plan for the Los Angeles and Ventura Counties region.

In addition to articulating a vision statement and performing a comprehensive Needs Assessment, the Plan prioritized Users Services and Market Packages as defined by the National ITS Architecture. Advanced Traveler Information Systems (ATIS) was identified as a major market package. It is funded and envisioned as a “design once and deploy many” system and leverages investments already made in the Orange County traveler information system, “TravelTIP,” and other Showcase compliant projects. The design of LA/Ventura ATIS reuses many of the TravelTIP design elements, pursuant to specific business parameters unique to the LA/Ventura ATIS Business Plan.

Perhaps the most unique aspect of the LA/Ventura ATIS Business Plan was the desire to test the feasibility of public/private partnership in the dissemination of traveler information to the public. The original Business Plan called for the creation of “bridge funding” to facilitate deployment, operation and maintenance of the system for a “pilot” period while partners resolve the most equitable and sustainable methods of sharing funding responsibility for ITS projects with regional significance. Since that time, expectations surrounding the value of LA/Ventura ATIS have been scaled back considerably, given the lack of public resources available to fund greater regional integration of ITS projects and programs to the standards promulgated by federal policy. Given the findings presented in the Blue Ribbon Panel and discussed in Appendix A, further dialogue among partners regarding the most equitable method of sharing funding responsibility for regional advanced traveler information systems should be continued.

The LA/Ventura ATIS Integrated Workstation has been developed in accordance with evolving Intelligent Transportation System (ITS) standards. Traffic operations centers at Los Angeles County and local cities were fully integrated with Caltrans TMC and MTA through the Showcase network. The Integrated Workstation interfaces with the Showcase Network’s Kernel Server.

The LA/Ventura ATIS Server essentially acts as the single interface point for the private sector. Through the use of software elements known as the Kernel and Seed, which provide common

network functions such as time synchronization, security, information sharing, database queries, and the shared control of field elements, the LA/Ventura ATIS system is able to collect data from existing legacy systems. Each participating system on the Showcase Network contains its own piece of the Kernel, called a Kernel client. The LA/Ventura ATIS Server acts as the Kernel client for Information Service Providers (ISPs). The LA/Ventura ATIS transforms the collected transportation data into a standard XML format for ISPs.

**Exhibit 6 – Physical Architecture Implemented for LA/Ventura ATIS**

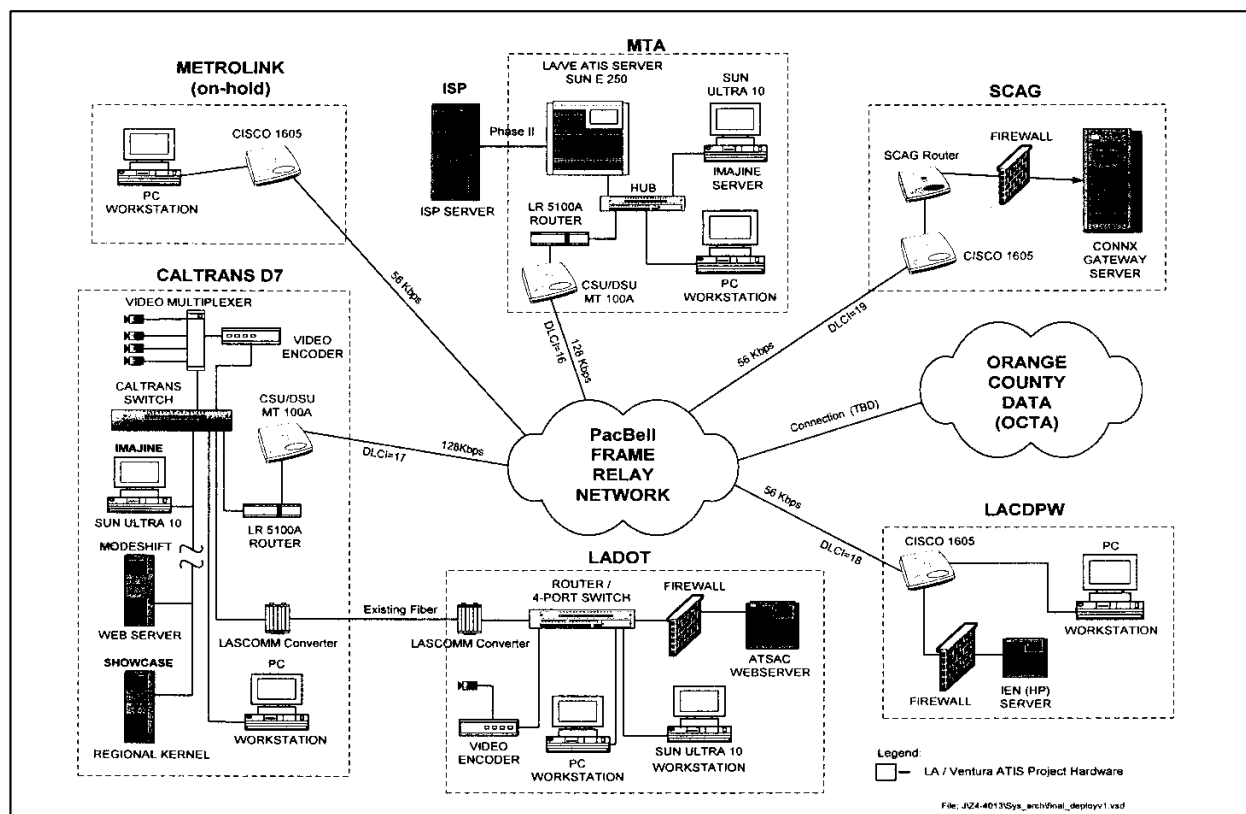


Exhibit 6 provides a high-level overview of the LA/Ventura ATIS system design. LA/Ventura ATIS, which is part of the Southern California Priority Corridor Showcase architecture, relies on several critical elements:

- Public and private entities who operate management systems that manipulate real-time travel data containing information of interest to one or more classes of end users, including commuters, business visitors, tourists, CVO operators and transit users;
- A means of translating disparate types of publicly-available public sector data into a common format for distribution to private sector data disseminators;
- A regional communications network that allows the source agencies to communicate this data to the public and private information disseminators, and;

- A means of managing the regional communications network to facilitate secure, reliable information exchange among the participating users including both public and private facilities.

There is a vast array of local transportation management systems throughout the Los Angeles and Ventura County metropolitan region. While each has a varying degree of automation, most can eventually provide interface support to the LA/Ventura ATIS system and data pertinent to a regional travel information dissemination system. The scalability built into the LA/Ventura ATIS system will allow for the incremental expansion of the local traffic network information at comparatively low cost. The management systems can be classified into the following transportation data domains shown in Exhibit 7.

#### **Exhibit 7 – LA/Ventura ATIS High-Level System Design**

<b>DOMAIN</b>	<b>DATA TYPES AVAILABLE (not necessarily automated)</b>
Freeway	Events, Congestion, Device Status, CCTV Video
Arterial	Events, Congestion, Device Status, CCTV Video
Public Transportation	Events, Schedules (Static & Dynamic), Routes, Stops, Fares
Public Safety	Incident Notification and Details
Commercial Vehicle Operations	Route Restrictions, Intermodal Facility Data, Weather Affecting CVO
Remote Workstations (Arterial and Transit)	Local Traffic Advisories, Transit System Advisories
Private Sector	CCTV Video, Travel Times, Route Guidance, Personalized Information

The software vendor was tasked to develop custom software for LA/Ventura ATIS to be installed at the Caltrans District 7 TMC and the sponsor agency, MTA, to extract the desired data from existing legacy systems. Data translation was performed through a “legacy bridge” (or ‘seed’), which converts data from the host system’s format into a common Showcase data communications format. Through the seed, data such as incident details, construction activity and resulting lane closures, real-time congestion data, CCTV status, and CMS sign status can be extracted from the system traffic and events database tables and placed on the regional network as Showcase-managed objects. In the case of MTA and the Caltrans District 7 TMC, the bridge software resides on servers that interface to Integrated Workstations, which provide a Windows™-like graphical user interface (GUI) for allowing operators to adjust settings and view traveler information. The LA/Ventura ATIS server reformats the different transportation domain data into a format (XML) suitable for private sector consumption.

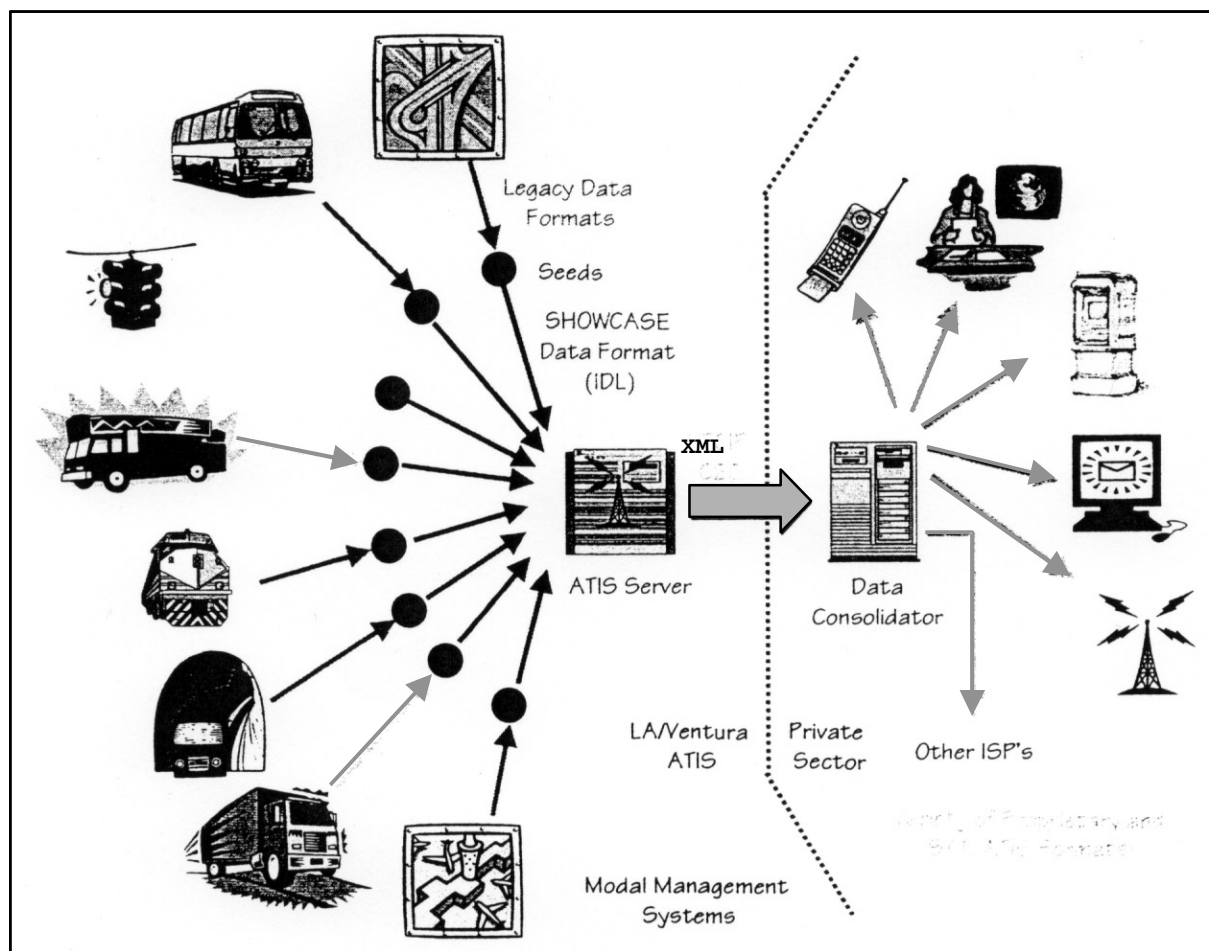
The ATIS software application consists of a street map that can be manipulated to display current freeway, highway and arterial traffic conditions at varying levels of detail and scale, including specific events. MTA bus and rail transit information, specifically, schedule, station locations and routing, can also be accessed. The map shown on the default GUI displays color-



coded overlays representing real-time traffic congestion. Each overlay segment color represents the average speed as measured from roadway loop detectors. Icons displayed on the map depict specific traffic events and other useful information, which can be displayed on a countywide or citywide basis. Users can also select a dynamic element on the map to retrieve more detailed information about the specific item. Although the system takes a bit of time to launch, the GUI for LA/Ventura ATIS is generally user-friendly and easy to navigate. The evaluation team performed several comprehensive functional evaluations of the LA/Ventura ATIS system at the MTA Integrated Workstation, and determined that all system requirements in accordance with the LA/Ventura ATIS Integrated Workstation Operations and Maintenance Manual were met.

The regional network is composed of the physical communications infrastructure need to support the data flows required to collect and disseminate advanced traveler information. Exhibit 8 illustrates how these various elements are combined together to form the LA/Ventura ATIS. The LA/Ventura ATIS regional network consists of physical communications links carrying transportation objects and their attributes. To standardize how member agencies interact with the network, the Common Object Request Broker Architecture (CORBA) was selected by the Project Steering Committee. CORBA defines how objects are communicated from point to point, as well as provides the building blocks needed to perform common network services.

**Exhibit 8 – LA/Ventura ATIS High-Level System Design**



LA/Ventura ATIS is a significant piece in a much larger, multi-stage regional effort that involves several planned and ongoing projects, including:

- ▶ Regional Integration of ITS (RIITS) project – This ongoing project by the LACMTA develops an ITS network for the Los Angeles/Ventura region, as well as helps institutionalize associated administrative functions such as configuration management. RIITS binds all of the region's other ITS projects together. Given the need to integrate disparate traveler information, trip itinerary and ridesharing database management functions into a single regional point-of-dissemination, the RIITS project should be considered the backbone of a publicly owned and operated one-stop transportation portal for travelers in Los Angeles and Ventura counties.
- ▶ Information Exchange Network (IEN) project – This ongoing project by the LACDPW integrates and coordinates the traffic signal systems of various cities throughout Los Angeles County. Once completed, the IEN will become a significant source of data regarding arterial traffic conditions throughout the county.
- ▶ Mode Shift project – This ongoing Priority Corridor Showcase project is managed by Caltrans District 7 and should be complete within the next month. Mode Shift develops a website that helps travelers plan their trips. Users enter an origin, destination and other travel information, and the system calculates the best routes via both personal automobile and public transit. The goal is to show users that transit is sometimes a better mode of travel.

LA/Ventura ATIS has succeeded in providing an early demonstration of the integration of advanced traffic management and traveler information systems within the Southern California Priority Corridor.

### **3 System Performance Evaluation**

#### ***3.1 The Project/System Development Process and Timeline***

*LA/Ventura ATIS's development followed a systems engineering process, but took much longer than originally anticipated.*

LA/Ventura ATIS is the culmination of over four years of design, software development and implementation efforts. An initial RFP was issued in January 1999, and the sponsor agency, MTA, received Board approval on March 25, 1999. A revised workplan was approved in April 1999, and National Engineering Technology (NET) was selected later that month as the system developer. The contract was executed in May 1999 and the kick-off meeting was held on May 13. Originally envisioned to be completed in early January 2001, the project was completed in January 2003.

LA/Ventura ATIS is primarily a software development and systems integration project, and utilized the traditional systems engineering approach as evidenced by the following project milestones and deliverables:

- ▶ April 2000 – Final User Needs Assessment completed
- ▶ October 2000 – Final Functional Requirements Definition
- ▶ November 2001 – High Level Design (Software Architecture Report)
- ▶ November 2001 – Detailed Design (Implementation Phasing Plan)
- ▶ November 2002 – Implementation and Acceptance Test Plan
- ▶ December 2002 – System Acceptance Tests
- ▶ February 2002 – Final Business Plan Framework
- ▶ May 2002 – Outreach and Partnership Development
- ▶ February 2003 – O&M and Training
- ▶ May 28, 2003 – Blue Ribbon Panel
- ▶ Draft Report
- ▶ Final Report

The fixed-price LA/Ventura ATIS contract initially specified an 18-month period of performance, but as the dates on the above milestones reveal, the significant amount of time required to plan, design and reach consensus on the ATIS was much longer. The above timeline shows that although software implementation, integration and testing was accomplished in roughly 12 months, the coordination, consensus building and system planning that preceded these activities required roughly two-and-a-half years of effort. This additional time required the contract to be amended several times to extend its period of performance; however, the fixed-price budget was increased by only 7%.

The two documents that required the most effort were the User Needs Assessment and System Functional Requirements documents. The User Needs Assessment was finalized almost 12 months into the project, and the Functional Requirements were finalized six months later.

Another 12 months was spent preparing the system design. Future ITS projects might benefit from initiatives that make review and finalization of such documents more time-efficient. Such initiatives might include:

1. Approach the system development in “baby steps.” Keep the first implementation as simple as possible by focusing on only the most basic and critical system requirements, and leave less critical items to future builds of the system. During the project, workshops were held to capture stakeholders’ desires for the system. All of these desires were catalogued in the project’s Requirements document, but an additional Implementation Phasing Plan (IPP) was developed to specify which requirements would be implemented immediately and which ones would be saved for future builds. This approach encouraged stakeholders to be open and creative, provided an archive for the ideas generated, but also provided a mechanism for managing what could be reasonably accomplished within the existing project budget.
2. Develop and use formal document review procedures that define the manner and format in which comments/issues will be received, processed, and resolved. With so many stakeholders involved in the LA/Ventura ATIS project, this helped streamline the task considerably.
3. If schedule adherence is a top priority for the project, strictly limit the amount of time to read and review a document to two weeks, and gain stakeholder commitment to maintain this schedule. Although this will help keep the project on schedule, it may conflict with stakeholders’ busy schedules and hinder or sacrifice their involvement. The LA/Ventura ATIS project team considered stakeholder involvement to be a higher priority, so document reviews were sometimes extended to several months.
4. Make formal oral presentations of major documents to stakeholders in order to gather direct feedback and respond more quickly to stakeholder concerns. This is particularly useful for large, detailed documents that would otherwise require a more careful and lengthy review. This approach provides an opportunity to discuss any overly detailed information, as well as helps summarize and bring focus to the more important items that may require timely stakeholder action. The project team used this approach to present the system’s Detailed Design document.
5. Dictate drafts of major documents onto tape or CD and circulate them as “books-on-tape” so that they are more convenient to carry and review while traveling, commuting, etc. This may be useful for those who are looking for ways to more efficiently use their time. Although this approach was not employed for LA/Ventura ATIS, the evaluation provides it as a novel approach for others to consider.

### **3.2 System reliability, availability, compatibility, and scalability**

#### **3.2.1 System Reliability and Availability**

*The LA/Ventura ATIS system is functionally operational and may be made available to the general public through the MTA website.*

In the six months since operations start-up, there has been no evidence of any significant system failures. MTA intends to create a link to LA/Ventura ATIS on its website ([www.mta.net](http://www.mta.net)), and the web-based version of LA/Ventura ATIS will have the basic functionality of the Integrated Workstation. It must be noted that the LA/Ventura ATIS project is only one step of a much larger, multi-stage effort. At this time, full deployment of LA/Ventura ATIS is pending the establishment of a business framework that establishes a mutually accepted method of sharing funding responsibilities among partner agencies. For the time being, the Integrated Workstation at MTA is fully functional but remains under-utilized – without a full-time administrator assigned to ATIS.

The Integrated Workstation's software, critical system software, and system resources such as network connectivity, CPU usage and disk space can be monitored through the Big Brother utility, which can be viewed by initiating the web browser on the LA/Ventura ATIS Integrated Workstation. The administrator is prompted to enter a valid user identification and password to continue. Once the administrator is successfully logged in, the Administrator can view the LA/Ventura Administration window, which shows system monitor, a historical log, operator activity and ISP user reports. A review of the Big Brother utility reveals that the LA/Ventura ATIS system has a mean time between failure (MTBF) greater than 1,200 hours.

#### **3.2.2 Compatibility**

*There are no indications of any system incompatibilities.*

*Compatibility* is the ability of two or more systems or components to perform their required functions while sharing the same hardware or software environment. There have not been any system failures or anomalies experienced during the six months of this study that would indicate an incompatibility with the existing software/hardware environment.

### 3.2.3 Scalability

*As a distributed, object-oriented system, LA/Ventura ATIS is scalable to accommodate several additional centers.*

*Scalability* describes the extent to which system usage can grow without sacrificing system performance or requiring architectural or technology changes. In this study, system usage is defined in terms of data (object) throughput and is measured in units of megabytes per second (MB/sec). System usage could increase due to an increased utilization of existing workstations or because of the addition of new centers and workstations onto the LA/Ventura network. The factors that influence the system's scalability include:

- ▶ Hardware capability
- ▶ Software design.

LA/Ventura ATIS Server performs the function of dissemination of a web page to the Internet and provides an XML interface for private dissemination. The web page provides the public with a traffic congestion graphical map display, as well as transit and other transportation related information. The LA/Ventura ATIS Workstation relies on congestion segment and VDS configuration data so that the real-time traffic data is mapped to the correct detector loops on the freeway. These configurations may change as agencies add or modify traffic signals or revise congestion segment limits. The ability to create, modify and/or delete congestion segments and Vehicle Detection Stations (VDS) is accomplished through the Object Management application. The LA/Ventura ATIS system uses the 'mkcfg' utility to convert ATSAC shp-dbf files to NET segment and VDS data files.

Software design also effects scalability. The more modular the software is, the easier it is to modify without making major design or architectural changes. LA/Ventura ATIS's object-oriented software design is modular and utilizes Showcase's standardized, non-proprietary objects. City and County traffic operations centers that chose to join will be integrated with Caltrans TMCs and MTA through the Showcase network. Because LA/Ventura ATIS is a distributed system in which each workstation processes its own workload, adding centers to the network should not significantly impact the system's performance.

The LA/Ventura ATIS system is capable of supporting up to 50 independent data sources, 15 simultaneous operators, and up to 5 ISPs. The system can be scaled from this initial number of sources, operators and ISPs to the maximum through the addition of processors and communications equipment, and reconfiguration of existing processes over the added equipment.

### ***3.3 Impact of Showcase Integration on Project Deployment and System Performance***

LA/Ventura ATIS is one of 17 projects that make up the Showcase Program and Network. As such, many interdependencies developed between the projects as plans were made for eventual regional and corridor-wide integration. This section describes how these interdependencies impacted LA/Ventura ATIS and other Showcase projects.

#### **3.3.1 Impact of LA/Ventura ATIS on other Showcase Projects**

*LA/Ventura ATIS is the Second Showcase Project to Integrate Traffic Operations, Transit Operations and Kernel Version 1.0*

As the second Showcase project to involve a multimodal, inter-jurisdictional exchange of data, LA/Ventura ATIS has contributed to the state-of-the-art in the development of object definitions and interface standards for traveler information systems within the Southern California Priority Corridor. These standards provide a common understanding of the representation and interaction of transit elements (e.g. buses, drivers, routes) in object-oriented software. When employed in subsequent transit-related ITS projects in Southern California, these standards will aid system integration, help ensure system interoperability, and support the Showcase Program's goal of "design once, deploy many times," which seeks to achieve cost efficiency through modular system design and software reuse.

As the leading traveler information system for the region, LA/Ventura ATIS provides the software platform for Mode Shift, which enables users to generate travel itineraries based on real-time traffic conditions and transit schedules that identify the most convenient modes of travel.

#### **3.3.2 Impact of other Showcase Projects on LA/Ventura ATIS**

*Delays with the Kernel Delayed the Development of LA/Ventura ATIS*

The four regional Kernels comprise the centerpiece of the Showcase Architecture. The Kernels authenticate (identify and approve) agency centers that wish to log on to the Showcase Network, as well as provide additional common services such as location translation, "yellow pages," publish & subscribe, and query. Regional systems that wish to exchange information across the interregional Showcase Network must contain software to communicate and interface with the Kernels.

The Kernels were developed in parallel with other Early Start projects such as LA/Ventura ATIS, IMAJINE and TravelTIP. This situation of concurrent development provided an opportunity for constructive feedback between the projects, but also slowed development of all three as design details were shared and consensus was built.

## 4 Cost Evaluation

The cost evaluation draws information from documented costs and personal interviews. Budget information was taken directly from the project's contracts and amendments, while operations and maintenance costs were obtained from discussions with agency personnel. Informal interviews were conducted to verify information and fill in any "holes" that were discovered during analysis.

### 4.1 Constraints & Assumptions

There are two primary considerations for the Cost Evaluation:

- ▶ Since LA/Ventura ATIS was funded through a firm fixed price contract, the project's budget information reflects the expenses and costs for services paid by the client agency, but not necessarily the actual detailed costs for goods and services borne by the contractor.
- ▶ Operations and maintenance (O&M) costs have been estimated based on available information and certain assumptions indicated later in this section.

### 4.2 Project Budget & Estimated Development Costs

This section addresses the project's contracted tasks and budget, as well as its role in supporting the Showcase Program's "design once, deploy many times" philosophy.

#### 4.2.1 Project Budget

*Although the project took three times as long as anticipated, there was a small increase in the budget.*

Initially, the project budget for LA/Ventura ATIS was \$1,431,489. In March 2003, the MTA Board approved an amendment to the contract to provide funding for a Blue Ribbon Panel to discuss the long-term funding and deployment alternatives for the ATIS. This increased the total contract value to \$1,531,156. The funding breakdown is as follows: 80% federal, 10% state and 10% local. Exhibit 9 lists the project's ten tasks and the budget associated with each one, as agreed to in the initial contract and subsequent contract amendments. More detail regarding each task is provided below. Since the project was negotiated as a fixed-price contract, the budgets shown in Exhibit 9 might not accurately reflect actual costs and expenditures.



**Exhibit 9 – LA/Ventura ATIS Project Budget per Task<sup>4</sup>**

<b>Task/Cost Item</b>	<b>Initial Budget</b>	<b>Initial %</b>	<b>Final Budget</b>	<b>Final %</b>
Task 1 – Outreach	\$108,601	7.6%	\$155,145	10.1%
Task 2 – Final User Needs Assessment	\$124,074	8.7%	\$124,074	8.1%
Task 3 – Final Functional Requirements Definition	\$441,476	30.8%	\$505,437	33.0%
Task 4 – Implementation and Acceptance Test	\$434,862	30.4%	\$359,801	23.5%
Task 5 – System Acceptance Tests	\$ 48,185	3.4%	\$59,054	3.8%
Task 6 – Final Business Plan Framework	\$ 81,532	5.7%	\$ 88,355	5.8%
Task 7 – Outreach and Partnership Development	\$46,544	3.2%	\$ 57,107	3.8%
Task 8 – O&M and Training	\$146,211	10.2%	\$146,192	9.5%
Task 9 – Draft Report	-0-	0.0%	\$17,995	1.2%
Task 10 – Final Report	-0-	0.0%	\$17,995	1.2%
<b>Total</b>	<b>\$1,431,489</b>	<b>100.0%</b>	<b>\$1,531,156</b>	<b>100.0%</b>

The greatest single cost of LA/Ventura ATIS consisted of designing functional requirements definitions. Two integrated workstations – which are responsible for interfacing with existing legacy systems and providing an operator interface – were purchased for MTA and the Caltrans District 7 TMC. The total cost for the four workstations (hardware only) is \$8,000. The remainder (and majority) of the equipment cost was for network components and for upgrading existing systems at LACMTA and Caltrans to make them compatible with current software standards and tools.

Implementation and Integration (which includes COTS software purchases and custom software development) accounted for 24.5% of LA/Ventura ATIS’s total budget.

The high-level system diagram in Exhibit 6 on page 22 shows that the LA/Ventura ATIS system consists of the following hardware:

**Exhibit 10 – LA/Ventura ATIS System Hardware Items**

<b>Hardware Item</b>	<b>Quantity</b>
Fibre Optic Transceiver	1
Firewall/4-port Switch	1
Router/CSU (LADOT)	1
Router/CSU (LACDPW)	1
Router/CSU (LACMTA)	1
Router/CSU (Caltrans)	1
Router/CSU (SCAG)	1
Sun Microsystems E250	1
1/100 Base T Ethernet	1
Power Cables	3
Category 5 Network Cable	1
Sun Microsystems Ultra 10 Workstation (LADOT Bridge Server)	1
Monitor Coaxial Cable	

Hardware Item	Quantity
Power Cables	3
Category 5 Network Cable	1
1.4Mhz/1GB RAM/20 GB HD Integrated Workstation/10/100 Base T Ethernet (LADOT)	1
Monitor Coaxial Cable	1
Power Cables	1
Mouse Cable	1
Category 5 Network Cable	1
1.4Mhz/1GB RAM/20 GB HD Integrated Workstation/10/100 Base T Ethernet (Caltrans)	1
Monitor Coaxial Cable	1
Power Cables	3
Mouse Cable	1
Category 5 Network Cable	1
1.4Mhz/1GB RAM/20 GB HD Integrated Workstation/10/100 Base T Ethernet (LACMTA)	1
Monitor Coaxial Cable	1
Power Cables	3
Mouse Cable	1
Category 5 Network Cable	1
Dell Precision Workstation 330 (LADPW)	1
Monitor Coaxial Cable	1
Power Cables	3
Mouse Cable	1
Category 5 Network Cable	1

Based on this information, equipment costs for the LA/Ventura ATIS project totaled \$185,520.

#### 4.2.2 Design Once, Deploy Many Times

*LA/Ventura ATIS supports the “design once, deploy many times” philosophy through the use of the Showcase Program’s high-level Kernel-Seed architecture, object-oriented technology, and standardized objects and interfaces.*

“Design Once, Deploy Many Times” is the Priority Corridor’s philosophy for achieving cost efficiency through a modular system design, software re-use, and “economy of scale.” In general, LA/Ventura ATIS supports the “design once, deploy many times” philosophy through the use of the Showcase Program’s high-level Kernel-Seed architecture, object-oriented technology, and standardized objects and interfaces (CORBA IDL).

LA/Ventura ATIS’s design is based on the high-level Kernel-Seed architecture developed under the ‘Scoping and Design’ project. This architecture specifies the use of standard objects and

interfaces to help ensure system-to-system interoperability. Some of the object definitions used by LA/Ventura ATIS, particularly the VDS object, were developed under the TravelTIP project and subsequently ported to LA/Ventura ATIS. Similarly, several object definitions developed under IMAJINE were utilized in the Los Angeles/Ventura Regional ATIS project. These object definitions include the transit bus object, CCTV object, and CMS object.

### **4.3 Estimated Operations & Maintenance Costs**

*Given that the ownership and operation of LA/Ventura ATIS has not yet been determined, no attempt is made to allocate estimated O&M costs among project sponsors.*

#### **4.3.1 Operations**

The operations cost for LA/Ventura ATIS has been broken down into three contributing components: labor costs, utility costs, and office space costs. Each of these cost components applies in a varying degree to each project participant. For example, not all agencies plan to continuously monitor their Remote Workstations or to hire technicians specifically for that purpose. Because Caltrans, LACMTA and sponsoring agencies have not yet established a detailed business framework that identifies the short-term feasibility of covering ongoing operations and maintenance costs through subscription-based services, there has not been any analysis performed regarding fee levels and the revenue potential to pay to operate and maintain the server and pay for ongoing communications costs through subscription-based services.

##### **4.3.1.1 Labor**

LA/Ventura ATIS provides a system administrator interface for entering and viewing advisories about known incidents, traffic conditions, and planned lane closures that might impact traffic. Larger TMCs may wish to assign one FTE to monitor and enter advisories on the system, while smaller TMCs are unlikely to require a full FTE.

As noted in Section 3.2.1, the LA/Ventura ATIS project is only one step of a multi-stage effort. While the ATIS system is functional, the partner agencies report that they currently do not assign full-time staff to operate the system and, therefore, incur indirect labor costs that are included as part of overhead and G&A support.

##### **4.3.1.2 Utilities**

The utility costs that are most attributable to the LA/Ventura ATIS system are electricity (for powering the Remote Workstations) and telecommunications (for interagency communications). Some partner agencies experience a greater cost impact than others, depending on the number of legacy systems already in place. Exhibit 11 estimates the annual electricity cost impact that

could be produced by LA/Ventura ATIS hardware. These estimates are based on the following assumptions:

- ▶ An average electricity rate of \$0.16 per kW-hour (the actual rate varies seasonally)
- ▶ PCs and workstations operate 8 hours per day, 48 weeks per year
- ▶ Monitors draw 135W for 8 hours each day, draw 15W in “sleep” mode overnight, and operate 48 weeks per year.

#### **Exhibit 11 – Estimated Marginal Annual Electricity Costs for LA/Ventura ATIS**

<b>Hardware Item</b>	<b>Model</b>	<b>Power Draw</b>	<b>Power Cost</b>	<b>Est. Annual Cost</b>
1 Remote Workstation	Dell Precision	250W ea.	\$0.16/kW-hr	\$77
3 Integrated Workstations	10/100 Base T Ethernet	250W ea.	\$0.16/kW-hr	\$231
4 typical 21” color monitors	Various	15W-135W ea.	\$0.16/kW-hr	\$163
				<b>\$471</b>

Because telecommunications make up the largest portion of the operating cost, LA/Ventura ATIS uses separate services for its low-cost, low-bandwidth data needs and its high-cost, high-bandwidth video needs. As depicted previously in Exhibit 6, LA/Ventura ATIS telecommunications needs consist of the following:

#### **Exhibit 12 – Monthly and Annual Telecommunications Costs (Data only)**

<b>Description</b>	<b>One-time Installation Fee</b>	<b>Ongoing Monthly Cost</b>	<b>Ongoing Annual Cost</b>
Leased 56K data connection from Metrolink to MTA	\$1,260	\$149	<b>\$1,788</b>
Leased 56K data connection from SCAG to MTA	\$1,260	\$100	<b>\$1,200</b>
Leased 56K data connection from LACDPW to MTA	\$1,260	\$100	<b>\$1,200</b>
			<b>\$4,188</b>

The monthly cost for the ISDN service at MTA and Caltrans is based on actual number of hours of usage. For Exhibit 13, the estimated monthly cost for these agencies assumes a 22-working-day month with one hour of use per workday. Caltrans, however, pays a flat monthly rate that was previously negotiated by the State of California.

#### **Exhibit 13 – Monthly and Annual Telecommunications Costs (Video only)**

<b>Description</b>	<b>One-time Installation Fee</b>	<b>Est. Ongoing Monthly Cost</b>	<b>Est. Ongoing Annual Cost</b>
Leased 128Kbps ISDN video connection for Caltrans D7	\$220	\$61	<b>\$732</b>
Leased 128Kbps ISDN video connection for MTA	\$880	\$116	<b>\$1,392</b>
			<b>\$2,124</b>

Exhibit 14 combines the estimated annual costs for data and video telecommunications to arrive at an estimated total annual telecommunications overall. The precise cost of third party subscription services is not known at this time.

**Exhibit 14 – Summary of Estimated Annual LA/Ventura ATIS Telecommunications Costs**

<b>Description</b>	<b>Data Connection</b>
Data Connection	\$4,188
Video Connection	\$2,124
Estimated Annual Cost	\$6,312

Exhibit 15 combines the estimated annual costs for electricity (from Exhibit 11) and telecommunications (from Exhibit 14) to arrive at an estimated total annual utility costs.

**Exhibit 15 – Total Annual Utility Costs per Agency for Operating LA/Ventura ATIS**

<b>Agency</b>	<b>Electricity</b>
Electricity	\$394
Telecommunications	\$6,312
Total	\$6,706

*4.3.1.3 Office Space*

All partner agencies reported that there was no additional financial cost for the space occupied by LA/Ventura ATIS equipment because there is no specific accounting down to the project or system level.

**4.3.2 Maintenance**

Each agency covers its own system maintenance costs, including both labor and replacement hardware/software. Maintenance costs are estimated to average \$4,500 annually.

## 5 Institutional Impacts Evaluation

### 5.1 *Impacts to Operations and Maintenance Procedures and Policies*

*O&M Costs should be divided among partner agencies through a mutually agreed upon cost sharing arrangement, given the limited potential for a fee- or advertising-based public-private partnership model.*

Per Board policy, MTA does not fund the O&M costs of intra-jurisdictional information systems that are shared with other agencies. Participation in the LA/Ventura ATIS project was contingent upon this condition. LA/Ventura ATIS was established in large part to explore the feasibility of disseminating traveler information through private sector Information Service Providers (ISPs). Broadcast media outlets currently have access to a wide range of traffic information systems such as Caltrans and the California Highway Patrol for traffic advisory information. However, their ability to disseminate information is hampered by limited bandwidth and incomplete information. The concept for LA/Ventura ATIS is that all relevant and meaningful traveler information would be consolidated into a single point and converted into a format usable by private ISPs.

Given the recent shift in business model from public-to-private to public-to-public and the absence of a consensus regarding how best deployment costs for LA/Ventura ATIS should be shared among partner agencies, further discussion regarding the parameters of guiding the initial stages of deployment is warranted. Until consensus around this issue is achieved, key policies and procedures regarding both short-term and long-term operations and maintenance cannot be finalized.

### 5.2 *Impacts to Staffing/Skill Levels and Training*

*LA/Ventura ATIS has had no impact to staffing or required skill levels.*

Users with general computer skills can operate a LA/Ventura ATIS workstation. The workstations have an intuitive Windows™-like user interface, and NET provided training and demonstrations to familiarize the project partners with the system's full range of capabilities.

Caltrans' Advanced Transportation Management System (ATMS) includes an advanced event management component that is automatically fed into the ATIS Server.

Though achieved under separate ITS efforts in the region, LA/Ventura ATIS also receives data from the California Highway Patrol (CHP). Incident data from CHP's CAD system is available in Showcase compliant format and is automatically uploaded to LA/Ventura ATIS. Use by LA/Ventura but developed by IMAJINE:

*The System Developer has provided extensive Operator and System Administrator training.*

The System Developer provided training as part of the project to help familiarize agency operators/representatives with the system's user interface and features. To accommodate busy schedules, agency staff (operators) were invited to attend one of four 8-hour classes consisting of lecture and hands-on workstation training. In addition, system administration staff were also invited to one of two 8-hour System Administrator/Maintenance Training classes. The Los Angeles/Ventura Regional Advanced Traveler Information System Integrated Workstation Operations and Maintenance Manual was prepared by the Software Developer on January 2003 for participants to keep.

### **5.3 Impacts to the Competitive Environment**

*LA/Ventura ATIS's system design is documented and non-proprietary.*

LA/Ventura ATIS has been successfully integrated to the Caltrans District 7 Intertie Server using Showcase standard object definitions. Open system design and complete documentation of the standard object definitions will enable future implementation and addition of new centers to the Showcase Network. Many of these object definitions and IDL are contained in various design documents for LA/Ventura ATIS and the Kernel, but no review has been done by the Priority Corridor to consolidate the information and verify its completeness.

### **5.4 Impacts to Local Planning Processes, Policy Development, and the Mainstreaming of ITS**

*LA/Ventura ATIS helped create both a physical and institutional foundation for further ITS development in Los Angeles County.*

Physically, one of the greatest accomplishments of the Showcase Program is its development of system interface standards for Southern California. Similar to the national effort on NTCIP, adoption of these standards will help promote interoperable systems that enable greater information sharing, improved agency coordination, and reduced costs over time. Furthermore, the deployment of the regional network and several new agency centers (Remote Workstations) provides a foundation on which functions and services can be tested, analyzed, improved, and added.

Perhaps more importantly, LA/Ventura ATIS helps to create a broader platform upon which to mainstream ITS in the region. Through the Advanced Traveler Information System experience, and based on the TravelTIP experience, regional partners have had the opportunity to address critical institutional issues and establish precedents for further regional integration of ITS. By interfacing directly with the Showcase Network's Kernel Server, LA/Ventura ATIS provides an early deployment of the integration of advanced traffic management and traveler information systems within the Southern California Priority Corridor. As originally envisioned, each region within the Southern California Priority Corridor would develop its own Kernel, which enables

common network functions such as time synchronization, security, information sharing, database queries, and the shared control of field elements. Each participating system on the Showcase network would contain its own piece of the Kernel, called a Kernel client. The LA/Ventura Integrated Workstation Server acted as the Kernel client for the private sector.

In contrast to TravelTIP, LA/Ventura ATIS' project sponsors committed to Showcase Kernel v1.0 as the client-server application to perform regional network management. Since the planned obsolescence of Orbix 3.0, which defines how objects are communicated from point-to-point, the Southern California ITS Priority Corridor Steering Committee recently adopted a distributed network architecture using Orbix 2000. Some of these critical issues facing further regional integration include, but are not necessarily limited to:

- ▶ System and information security
- ▶ System reliability
- ▶ Policies regarding shared control of field equipment such as CCTVs and CMSs
- ▶ Software ownership and the treatment of intellectual property rights
- ▶ Delegation of operations and maintenance responsibilities (including funding).

These precedents should help clear the way for future ITS advancements in Los Angeles County.

*Because the market for advanced traveler information is so competitive, LA/Ventura ATIS must be comprehensively and strategically marketed through a viable regional traveler portal that is public owned and operated under the control of the existing local partners.*

Because the marketplace for traveler information is saturated with traffic information disseminated through a variety of media (i.e., internet, television and radio) in a variety of formats (i.e., half-hour traffic reports, web sites, web links), LA/Ventura ATIS' project sponsors must devise an effective marketing platform that maximizes the unique attributes of the LA/Ventura ATIS system and differentiates LA/Ventura ATIS from other free and subscription-based online traveler information systems currently available. This must be accomplished within the context of a regional integration strategy that recognizes the importance of delivering convenient and free real-time information on-demand through both Internet and telephone-based systems. The purpose of this discussion is to identify some of the major on-demand traveler information systems currently available online and assess how LA/Ventura ATIS might leverage existing resources to compete in the evolving ITS marketplace.

There are many online traveler information systems that provide overlapping coverage of traffic conditions in Los Angeles and Ventura Counties and in Southern California in general. One of the more prominent traffic information services available is called [www.sigalert.com](http://www.sigalert.com), and is sponsored by a large insurance company that uses the traffic information portal as an advertising platform. The website is available as a link on the Caltrans District 7 ATMS, and provides real-time traffic conditions in regions throughout California. 'My Sigalert' subscribers can receive personalized traffic reports, including estimated travel time, on Internet-enabled wireless devices such as PDAs and cell phones. The live freeway traffic information displayed on [www.sigalert.com](http://www.sigalert.com) is taken from Caltrans District 7's Advanced Traveler Management System (ATMS), which provides real-time information on average speeds at Vehicle Detection Sensor



(VDS) locations throughout the freeway network and traffic advisories posted at the Transportation Management Center (TMC) and by through California Highway Patrol's CAD system.

The other major traveler information resource posted on the Caltrans District 7 website is [www.traffic.tann.net](http://www.traffic.tann.net), which is a personalized, online traveler information clearinghouse that enables the user to download user-friendly traffic maps to handheld wireless devices such as PDAs and cellular phones. The mission of the Travel Advisory News Network (TANN) is to provide its partners with "end-to-end digital technology communications solutions designed to promote the most efficient use of highways, streets and transit systems." This involves providing:

- Partners with the most efficient and cost-effective means of delivering their real-time traffic, transit and incident data to multimedia channels of consumer information distribution
- Media affiliate partners with open architecture access to comprehensive, robust, reliable, preintegrated content that along, or packaged with TANN-supplied paid advertising, opens doors to revenue-generating consumer marketing opportunities. Their media-customized and regionally customized news programming will provide the traveling public with 24/7 access relevant traveler information, enabling commuters to make informed traveling decisions.

Another important transportation resource available through the Caltrans District 7 website is [www.smartraveler.com](http://www.smartraveler.com), which provides traffic information directly to the public in cities where SmarTraveler has partnerships with public transportation agencies. SmarTraveler also works with private companies to deliver traffic reports. SmarTraveler is a Westwood One Company that provides real time traffic information in 83 U.S. cities. Westwood One is a major provider of traffic, news, sports, music, talk and entertainment programming to Web, wireless, in-vehicle and broadcast media. Although SmarTraveler offers traveler information in 83 U.S. cities, it does not provide traveler information in the greater Los Angeles marketplace.

The other traveler information systems currently available through the Caltrans District 7 website are [www.traffic411.com](http://www.traffic411.com) and ATSAC, the City of Los Angeles' traffic management system. A division of Fast Lane Networks Inc, Traffic411 was established in 2000 by a veteran Los Angeles traffic reporter. Traffic 411 is a provider of traffic reports and information over the Web and wireless networks, and sells licenses to media companies interested in offering real-time traffic on their Web sites. The City of Los Angeles' Advanced Traffic Surveillance and Control (ATSAC) system is a computer-based traffic signal control system that monitors traffic conditions and system performance, selects appropriate signal timing (control) strategies, and performs equipment diagnostics and alert functions. Information on traffic conditions is received on a real-time basis at the Operations Center, and posted to ATSAC website.

It is important to point out that business case for creating the most innovative, user-friendly and adaptable traveler information systems through a private fee-based approach has yet to be established. When private ISPs look for sources of real-time traffic information, they have

several traveler information systems to choose from. Some private traveler information companies are nationally oriented, providing personalized on-demand services through a growing number of regions. Others are based exclusively in the Southern California region, and provide more extensive freeway, arterial and transit data than systems with a more national orientation. Even though LA/Ventura ATIS may distinguish itself as the most comprehensive advanced traveler information system in Los Angeles and Ventura Counties, existing institutional partnerships and licensing agreement among private ISPs play as much a role in determining future deployment of advanced traveler information systems as regional integration efforts led by public agencies charged with ITS policies consistent with federal guidelines.

Other regions like the San Francisco Bay Area have led the effort to market and brand traveler information services in a manner that conveys a clear message to the marketplace that the region's transportation agency provides the most comprehensive and useful source of traveler information throughout the region.

The Metropolitan Transportation Commission (MTC) is launching [www.511.org](http://www.511.org), a one-stop source for all Bay Area transportation information. In July 2000, the U. S. Department of Transportation formalized a request to the Federal Communications Commission (FCC) to designate 511 as the nationwide number for transportation-related information. Since the federal designation of 511, MTC and local Bay Area transit operators have designed and planned a phone version with new voice response technology and the Web version. 511 is an online travel guide for the San Francisco Bay Area that provides the customer with information on local travel options and current traffic conditions. Bay Area travelers can dial 511 from any landline and most wireless phones to get real-time traffic conditions, information about public transportation fares, routes and schedules, carpooling, vanpooling and bicycling. The service is free and voice activated. MTC has engaged in a comprehensive marketing effort to advertise 511 as the region's one-stop traffic information center well in advance of full-scale deployment. Such efforts acknowledge the fact that developing and implementing a comprehensive marketing plan plays as important a role in achieving business objectives as system integration and architecture design considerations.

These on-demand services provide examples of early deployments of advanced traveler information systems similar in nature to LA/Ventura ATIS, each with a slightly differentiated business model. A major challenge to address is how television and radio media outlets such as KTLA, KFWB and others traditionally disseminate information about current traffic conditions, and the extent to which competition among existing traveler information systems will impact LA/Ventura ATIS' prospects. Morning television and radio news programs typically receive traffic information via traffic helicopter dispatches on the half-hour to hour. Because of bandwidth constraints (i.e., traffic reports are delivered in thirty-second sound bites), the amount of traffic information conveyed is usually limited to a few specific "hot spot" locations where incidents are causing traffic delays. The impact of radio traffic reports on travel behavior is murky at best. A recently conducted focus group consisting of TANN users found that while the typical commuter listens to traffic reports on the radio, they rarely ever change their route or time of departure based on that information (Volpe Institute, December 15, 2001).

Limited bandwidth notwithstanding, these reports do convey to the commuter a sense of timeliness that cannot be captured through on-demand advanced traveler information systems like [www.sigalert.com](http://www.sigalert.com), which require the user to navigate a regional freeway map to obtain specific pieces of traffic information through non-handheld workstations. ISPs typically supplement traffic reports with advisory information obtained directly from the California Highway Patrol's CAD system and Caltrans' ATMS. LA/Ventura ATIS has the potential to be a viable source of supplemental traffic information to online and more traditional media ISPs.

## 6 Traveler and Transportation Information Management Evaluation

### 6.1 Extent of Regional and Interregional Transportation and Traveler Information Integration Between Agencies

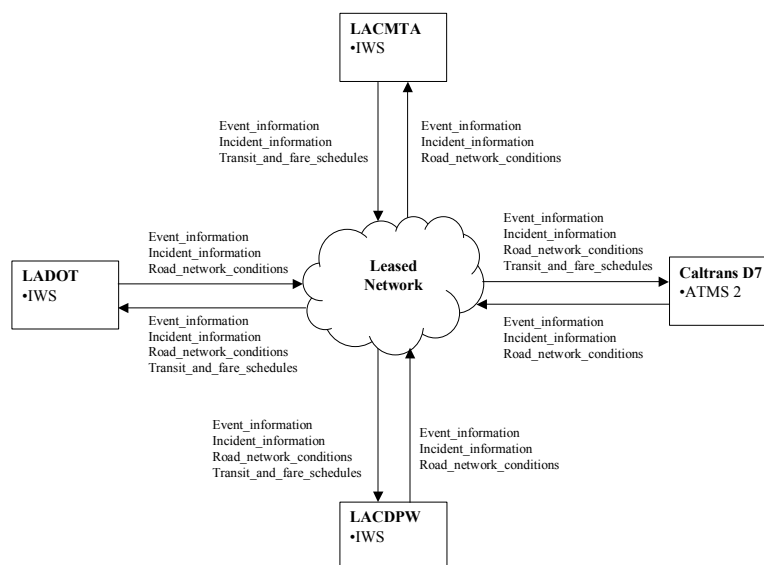
#### 6.1.1 LA/Ventura ATIS System Impact on Data Flows

*LA/Ventura ATIS builds on the integration efforts of the IMAJINE project, and is the next step in the region's ITS evolution.*

The point-to-point architecture distributes the traffic information bases to the network by having each agency manage their own network data. Exhibit 16 is a simple depiction of the point-to-point architecture that links centers by sharing of data. Caltrans, MTA and other local TMCs confer on policy issues but work independently to maintain and control their own systems. Event responses are independently generated by each based upon information sharing on the network. Coordination is achieved through agreed upon transportation management strategies that are implemented in each system and reported to the network. The benefit of the point-to-point architecture is that single-point system failures are less likely to cause major disruptions to the network response to events.

To facilitate data exchange among partner agencies, a Frame Relay Network has been implemented. The Frame Relay Network is the Regional Communications Network. Agency partners provide transportation data to the network and agencies with appropriate authorization can access data.

**Exhibit 16 – ITS Architecture Flows Implemented by LA/Ventura ATIS**



### 6.1.2 Impact on Traffic Operations and Communications

*Local TMCs report that access to highway, arterial and traffic advisory information will enable local jurisdictions to be more responsive in adapting signal timing and other operational strategies to real-time traffic events and conditions.*

The scalability of the LA/Ventura ATIS system, which will allow additional local TMCs throughout Los Angeles and Ventura counties to join the network in the future at no additional cost, will enhance the long-term value of the system as the traffic information coverage area increases. According to traffic managers interviewed, the benefit of LA/Ventura ATIS is the regional integration of traffic information, which will enable local jurisdictions to adapt traffic operations to real-time highway information. This will place more pressure to ensure effective communications between TMCs and the owner/operator and among local jurisdictions.

### **6.2 Utilization of Regional and Interregional Transportation and Traveler Information by Public Agencies**

*Partner agencies report that they utilize LA/Ventura ATIS primarily to verify that their agency's information is accurate and available to the end user.*

The LA/Ventura ATIS project represents an important part of a multi-stage effort. In the ITS marketplace today, there are several traveler information packages that disseminate VDS (congestion) and incident data from the Caltrans Advanced Traveler Management System (ATMS). LA/Ventura ATIS is unique from these traveler information systems because it packages freeway VDS and local traffic conditions, enabling local TMCs to modify signal timing to optimize traffic flow locally and regionally.

TMCs have indicated that they primarily use LA/Ventura ATIS to verify that their agency's information is accurately being uploaded to the system. None report using LA/Ventura ATIS to reevaluate operational strategies deployed within their jurisdiction. Given the project's scalability, the network of local traffic information can increase significantly at no additional cost. Access to a broader network of local traffic information will eventually enable LA/Ventura ATIS to be an effective tool in traffic operations and events planning.

## **7 Transportation System Impacts Evaluation**

This chapter describes the impacts of the LA/Ventura ATIS system on the transportation network in Los Angeles County. Because LA/Ventura ATIS is among the first projects to be developed in a multi-stage regional ITS integration effort and the public does not yet have Internet access to LA/Ventura ATIS, a detailed impacts analysis could not be performed at this time. The following sections describe the current status of the LA/Ventura ATIS system.

### ***7.1 Impacts to Mode Shifting and Intermodalism***

Any impact that the LA/Ventura ATIS system may have on mode shifting or intermodalism could not be detected at this time, due to the fact that it has not yet been made accessible to the public. It is the intent of the project sponsors to make LA/Ventura ATIS available to the public via a link on the sponsor's website. An analysis of the impacts of mode shifting and intermodalism can be performed once LA/Ventura ATIS is made available to the public. It is recommended that the agency that sponsors LA/Ventura ATIS support a web-based survey that requires new registered subscribers to complete a travel behavior survey as a condition of registration. The purpose of the survey should be to yield information about how often users rely on the website, what types of information are retrieved, how information impacts departure times and routing decisions, and to extent traveler information impacts mode choice.

### ***7.2 Impacts to Traffic Safety and Accident Reduction***

At this point, the LA/Ventura ATIS system does not have any detectable impact on traffic safety or accident reduction. The system is designed to display traffic advisory information reported by the California Highway Patrol (CHP) to enable motorists to modify routing and departure time decisions in order to avoid delays resulting from non-recurring incidents that cause an unplanned lane closure. Once public access to LA/Ventura ATIS is established, an analysis of the impacts of providing traffic advisory information on travel behavior can be performed through a quantitative survey research.

### ***7.3 Impacts to Traffic Congestion***

At this point, LA/Ventura ATIS does not have any detectable impact on traffic congestion. This purpose of this section is to describe the likely impacts of the LA/Ventura ATIS system on the transportation network in Los Angeles County. Since LA/Ventura ATIS is only the first step of a multi-stage program, and the long-term proprietorship of the system has not yet been determined by project sponsors in consultation with the Priority Corridor Steering Committee, an analysis of the impacts of LA/Ventura ATIS on travel behavior, traffic safety, traffic congestion, air quality and transit operations could not be performed at this time. It should be pointed out that in the face of the myriad factors influencing travel behavior – of which access to advanced traveler information plays only a small part – it is not empirically feasible to perform a regional

before/after observational study investigating the impacts of early ITS deployment on changes in travel patterns.

Even if the net impact of travel behavior were substantial, there are simply too many other factors to control to be able to measure the unique impact of one or more ITS deployment project with any statistical precision. Given the early deployment of many Showcase projects, it is not feasible at this time to measure the impact of individual Showcase projects on travel adjustments (by time of day and route), mode shifts, traffic safety, and air quality in a comprehensive cost/benefit framework in a scientifically robust manner without first establishing how well these ITS services have penetrated the traveler information marketplace.

Based on preliminary research, the link between on-demand advanced traveler information systems on travel behavior may not be as straightforward as originally thought. Specifically, there may be cases in which access to traveler information results simultaneously in a decrease in time stuck in traffic and an increase in vehicle miles of travel (VMT). In such cases, traveler information can help commuters save time but can indirectly induce greater demand for travel. How can this be? Behavioral and cognitive attributes that influence how an individual seeks and processes information pertaining to one's commute choices vary widely. Consequently, a major priority in the empirical research should be to gain a better understanding of the parameters governing how people access and utilize traveler information.

Perhaps the best way to understand these net effects is to explore a hypothetical case. Beginning with the simplifying assumption that all person's have equal access to online web services, there are four basic parameters governing the net effect on travel behavior:

- whether or not people discover the advanced traveler information services
- whether or not people choose to utilize these resources
- what types of information individuals are looking for
- how information influences behavioral choices

Let's consider a hypothetical case in which there are 100 commuters, each with similar commuting profiles. Each commuter travels 40 miles roundtrip (journey-to-work distance is 20 miles), and the total roundtrip commute time is 90 minutes (45 minutes each way). Total, this group travels 4,000 miles per day (100 commuters \* 40 miles) and spends 9,000 minutes in travel time (100 commuters \* 90 minutes). This represents current conditions prior to the deployment of LA/Ventura ATIS.

After the marketing and full deployment of LA/Ventura ATIS, the following is learned about the awareness of and behavioral impact of LA/Ventura ATIS on commuting patterns. Of the 100 commuters:

- 10 have never heard of LA/Ventura ATIS (10%)
- 10 have heard of LA/Ventura ATIS but don't use it (10%)
- 25 use LA/Ventura ATIS and change their route (25%)
- 25 use LA/Ventura ATIS and change their departure time (25%)

- 25 use LA/Ventura ATIS, change their departure time and ‘trip chain’ with extra time saved (25%)
- 5 take alternative mode of travel (5%)

In the scenario described above, the assumptions regarding the market penetration (90 percent) are intentionally conservative in order to illustrate the upper limit of how a successful LA/Ventura ATIS deployment might impact net travel. In this example, it is worth pointing out that it is assumed that slightly over 4 of every 5 commuters who are aware of LA/Ventura ATIS report a change in travel patterns.

### Exhibit 17 – Impact of LA/Ventura ATIS On Travel Behavior

Group Categories		DAILY TRAVEL (Miles)			TRAVEL TIME (Minutes)		
		BEFORE	AFTER	NET	BEFORE	AFTER	NET
1. Never heard of LA/Ventura ATIS	10%	400	400	0	900	900	0
2. Aware of ATIS, but no change in travel	10%	400	400	0	900	900	0
3. Change in Route	25%	1,000	1,125	125	2,250	2,000	-250
4. Change in Departure Time (no added trip chaining)	25%	1,000	1,000	0	2,250	1,750	-500
5. Change in Departure Time (added trip chaining)	25%	1,000	1,250	250	2,250	2,500	250
6. Take alternative mode	5%	200	0	-200	450	425	-25
TOTAL	100%	4,000	4,125	150	9,000	8,450	-525

The table above shows the net travel impacts of LA/Ventura ATIS deployment. For the 10 commuters who have never heard of LA/Ventura ATIS and the 10 who are aware of LA/Ventura ATIS but do not change their travel, there is no net change in daily travel and travel time after LA/Ventura ATIS deployment. For the 25 commuters who take a slightly longer alternate route recommended by LA/Ventura ATIS, their roundtrip mileage increases from 40 to 50 miles, but their total time decreases from 90 to 80 minutes. For this group, LA/Ventura ATIS deployment resulted in a net increase in daily travel and a net decrease in travel time.

For the commuters who modify their departure time based on information retrieved from LA/Ventura ATIS, their travel distance remains unchanged but their total travel time decreases from 90 to 70 minutes. For the group, LA/Ventura ATIS results in a net decrease in total travel time of 500 minutes.

For the commuter who uses LA/Ventura ATIS to modify departure time and ‘trip chains’ to take advantage of time savings, miles traveled increases from 40 to 50 and total travel time increases slightly from 90 to 100 minutes. For this group, LA/Ventura ATIS results in a net increase of 1,250 in miles traveled and a net increase in travel time of 250 minutes. For the commuter who changes to an alternative mode of travel, there is a net decrease in distance traveled equal to the roundtrip commute distance and a slight net decrease in travel time from 90 to 85 minutes.



Taken as a whole, this scenario suggests that the net effects of ATIS deployment can be somewhat ambiguous, especially given what we know about how decreases in the generalized cost of travel can induce additional trip making in the form of greater ‘tripchaining,’ a phenomenon that has become an increasingly engrained characteristic of modern commuting habits. Although there was a net decrease in total travel time of 525 minutes in this hypothetical sample of 100 commuters, VMT increased from 4,000 to 4,125. While this increase in VMT appears relatively small, it is based on very conservative assumptions regarding induced travel.

Expanding this simple case to the population of Southern California commuters, it is next to impossible to extrapolate the cumulative effects of advanced traveler information services on travel, given the interplay of millions of minor adjustments in route choice, mode choice and trip departure times and the iterative network effects that influence travel conditions both on highways, local arterials and streets, and on transit, and the iterative adjustments made by travelers who rely on intuition and advanced traveler information systems to optimize their commutes. The point here is that the empirical magnitude of behavioral changes in response to greater traveler information can result in both positive outcomes for the individual commuter and less than desirable outcomes from a public policy standpoint. As mentioned previously, an unexplored area of ITS research that needs greater understanding is the relationship between advanced traveler information and induced travel.

What is known is that there have been over several dozen ITS deployments over the past five years that have the potential, both near and long term, to impact how individual commuters travel. Instead of focusing on the regional impacts of early ITS deployments, it is recommended that the evaluation of ITS projects focus more attention on individual preferences and how access to advanced traveler information informs travel choices for the individual. This can be accomplished through a sample-based market research study of Southern California commuters and focus groups. Before undertaking a comprehensive evaluation of impacts to regional travel, it is imperative that the investigative market research first focus on the following issues:

- What proportion of Southern California commuters are aware of the traveler information products and services available online?
- Where does the respondent obtain traveler information? (TV, radio, Internet, wireless devices, etc.) How did you find out about this traveler information portal?
- Is the respondent more likely to rely on the radio for traffic reports or use on-demand traveler information online?
- Do you frequent more than one online traveler information provider for traveler information?
- What sources of information do consumers of advanced traveler information rely on most?
- What device do consumers of traveler information rely on most to receive traveler information? (workstation, PC, PDA, cellular phone, etc.)

- How often do consumers of advanced traveler information check traffic conditions?
- Of commuters who rely on advanced traveler information services, to what extent does access to traveler information impacted your mode choice, departure times, route choice, and frequency of travel?

A CATI-based market research study of Los Angeles, Riverside, Ventura and Orange County motorists drawn randomly from the Department of Motor Vehicles (DMV) database using a stratified sampling methodology is recommended as the most appropriate means of testing a wide range of hypotheses regarding how advanced traveler information systems influence travel behavior. A biannual survey would provide an empirically sound basis for tracking the market penetration of advanced traveler information systems, changes in market preferences, technological innovations that influence information dissemination, and, of course, impacts of travel behavior.

It should be kept in mind that LA/Ventura ATIS is one among over a dozen advanced traveler information systems that are significantly further along in terms of deployment, technology and institutional partnering arrangements. Given the absence of any concerted effort to market LA/Ventura ATIS and postponement of the decision regarding the long term ownership and licensing, any attempt to disentangle the specific impacts of LA/Ventura ATIS from that of all the other advanced traveler information systems currently available through a range of PC and wireless devices is not recommended at this time.

## 8 Conclusions and Recommendations

LA/Ventura ATIS contributes to the strategic goal of deploying greater interregional integration of ITS in accordance with federal ITS architecture. While LA/Ventura ATIS has the potential to provide users throughout Los Angeles and Ventura counties with valuable, real-time freeway, arterial and local city information that expands the menu of travel choices available the traveling public, more consideration must be given to establishing a business plan that can best lead to direct startup with minimal exposure of economic risk. Given the consensus that LA/Ventura ATIS should be publicly owned, more consensus is required to differentiate LA/Ventura ATIS from commercially available traveler information systems that ISPs already deliver. As a public good, the general view among ISPs is that services LA/Ventura ATIS can provide a qualitatively unique advantage by providing more extension coverage and more accurate data.

LA/Ventura ATIS has helped lay both a physical and institutional foundation for further ITS development and expanded exchange and use of transportation data among the regional partners. However, there is uncertainty regarding the attributes and functionality of the “single-point” portal within which on-demand services like LA/Ventura ATIS information can be retrieved. The continued development of the Regional Integration of Intelligent Transportation Systems (RIITS) architecture may be the most cost effective strategy for supporting a regional on-demand transportation information portal. RIITS will enable data exchange between operating agencies via a regional network that includes emergency services, transit operators, ports and airports. As the RIITS project continues to mature and the building blocks of a regional system integration are in place, systems like LA/Ventura ATIS may be relegated to a state of perpetual pre-startup.

LA/Ventura ATIS is among the first system to be fully compliant with the corridor’s Showcase Architecture, and it is the second Showcase project to successfully integrate control centers and dispatch centers with the interregional Showcase Network.

The fixed-price LA/Ventura ATIS contract initially specified an 18-month period of performance, but the actual period of performance was extended several times so that key critical milestones were in sync with software development requirements. Although coordination, consensus building and system planning that preceded these activities required only eighteen months, LA/Ventura ATIS’s software implementation, integration and testing took approximately twice the time anticipated.

The planning documents that required the most effort were the Final User Needs Assessment, the Implementation Phasing Plan, and the System Architecture documents. Each of these documents required about six months of consensus building, preparation, review, discussion, and revision to complete. Future ITS projects might benefit from initiatives that make review and finalization of such documents more time-efficient. Such initiatives might include:

1. Approaching the system development in “baby steps.” Only include the most critical system requirements in the Requirements document, and leave less critical “wish list” items to future builds of the system.

2. Developing and using formal document review procedures that define the manner and format in which comments/issues will be received, processed, and resolved.
3. Strictly limiting the amount of time to read and review a document to two weeks, and gaining stakeholder commitment to maintain the schedule.
4. Making formal oral presentations of major documents to stakeholders in order to gather direct feedback and respond to stakeholder concerns.
5. Dictate drafts of major documents onto tape or CD and circulate them as “books-on-tape” so that they are more convenient to carry and review while traveling, commuting, etc.

Even though extra time was required to complete the project, there was no overrun of the initial cost estimate. This adherence to the original budget is due in part to cost-mitigating actions, such as a three-month hiatus, taken by the project team. Future ITS projects might benefit from a phased or task order-oriented approach that would permit a re-evaluation of the project’s progress and costs after each systems engineering step. This approach would aid in estimating project cost and duration, and would relieve some of the financial risk imposed on contractors by fixed-price agreements.

At this time, no assessment on the impact of LA/Ventura ATIS on travel behavior could be performed because no traveler information is currently made available to the general public.

In several months of observed system operation, there has been no evidence of any system failures. The Big Brother utility provides an easy-to-use tool that the network administrator can routinely utilize to monitor system activity, review the historical log and general ISP user reports.

In eight weeks of observed system operation, there has been no evidence of any major system failures. However, while the Integrated Workstation is functional, it is not accessible to users through the MTA website ([www.mta.net](http://www.mta.net)) and the system remains idle pending the disposition of responsibility for operating and maintaining the LA/Ventura ATIS system. While there was much anticipation regarding the ability of LA/Ventura ATIS to attract private sector interest, the economics of the ISP industry has changed dramatically since the development of the original business plan. In the recent Blue Ribbon Panel Summit, there was a general consensus that revenues could not be expected to materialize in the near future to defray the cost of operations and maintenance and that ISPs should not bear costs other than communication to the web server. The panel agreed that if a public-to-public model is supported, information exchange for traffic management purposes should be publicly supported. Another advantage of the public-to-public model that was identified is that it supports a centralized concentration point with a uniform standard interface.

Given general support for a public-to-public model, several institutional challenges must be addressed in order to identify potential Core Partners. A methodology for sharing the costs associated with retaining long-term ownership of the data consolidator will need to be developed.

1. How will financial risks to the Core Public Partner be mitigated?
2. How will operating and maintenance costs be shared among partner agencies in the event private ISPs do not subscribe for ATIS services to the extent anticipated?
3. What criteria should be used to determine whether ATIS should be operated and maintained by a sponsor agency or contracted to a third-party ATIS service?
4. What are the long term operating and maintenance costs of LA/Ventura ATIS under competing business framework alternatives?
5. Given the plethora of traveler information systems available both online and through conventional media outlets, how should LA/Ventura ATIS be marketed to distinguish its unique services from other advanced traveler information systems currently in the marketplace?
6. Where should bridge funding that will allow deployment to go forward for a “pilot” period come from?

Although the LA/Ventura ATIS system was successfully completed and tested, an analysis of LA/Ventura ATIS’s transportation system impacts could not be performed at this time because it has not been fully implemented in accordance to with the recommendations of the business plan. Specifically, no action has been taken on the implementation and creation of a bridge fund for a pilot period.

**Appendix A – Blue Ribbon Panel Summit Report, Los Angeles/Ventura Counties Regional Advanced Traveler Information System (ATIS) Task 8.0**

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# **Blue Ribbon Panel Summit Report**

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## **Los Angeles/Ventura Counties Regional Advanced Traveler Information System (ATIS) Task 8.0**

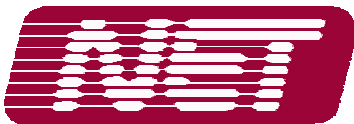
**(Final)**

**SPONSORED BY LOS ANGELES COUNTY  
METROPOLITAN TRANSPORTATION AUTHORITY**

**Reaching All Travelers “So Close & Yet So Far”**

Prepared by  
National Engineering Technology Corporation

*October 2003*



**BLUE RIBBON SUMMIT  
LOS ANGELES/VENTURA ADVANCED TRAVELER  
INFORMATION SYSTEM  
A MEETING HELD ON MAY 28<sup>TH</sup>, 2003**

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## EXECUTIVE SUMMARY

Over a period of several years the MTA has sponsored a number of activities and projects associated with the policy of widely distributing traveler information to the public. The policy is intended to help give individuals choices with regard to modes of travel, times of day to make trips and help with the selection of alternative routes to avoid delays caused by congestion and incidents. If effective, the expectation is that widely provided traveler information can help improve the efficiency of the transportation system.

A central project has been the Los Angeles/Ventura Advanced Traveler Information System (ATIS). Through the project a means has been created for integrating data from different agencies and making it available in a standardized format for receipt by private sector Information Service Providers (ISPs). ISPs are the media, both TV and radio and producers of products such as palm pilots and web sites that incorporate traveler information in their services. Through their products and services ISPs can potentially reach a wider audience than any public agency could do.

The Los Angeles/Ventura ATIS project was in its final stages and recommendations were being assembled on a business framework to support the long-term operation and maintenance of the service. The original hope, pre-dot.com failures, had been that revenues from the private sector would help support operation and maintenance of the information portal. The next steps recommendations now had to take account of the changed economic circumstances.

In addition, in the course of the project other complimentary activities within the MTA and a major project for the Regional Integration of ITS (RIITS), for the purpose of exchanging real-time information between transportation operators opened up new possibilities for information dissemination.

The MTA convened a Blue Ribbon Committee of experts to offer advice on the value of traveler information and listen to views in particular on issues associated with the financing of the operation and maintenance of such services. The full summary of the discussions is in the attached report. It is concluded that other metropolitan agencies in California have taken the view that it is necessary to make a long-term commitment to such investments in the interests of managing the efficient use of their transportation systems. The panel concurred with the finding of the Business Plan, that revenues from users couldn't be expected to materialize in the near future to help defray these costs. RIITS has the potential to become the required single point source for real-time system information. ISPs would have no costs other than communication to the web server. Other internal MTA traveler information initiatives for trip planning and ridesharing can also make use of this same source.

## PARTICIPANTS

### Panel Members:

Frankie Bannerjee, President Bannerjee & Associates

Genevieve Giuliano, Professor, School of Policy Planning & Development, USC

Steve De George, Director of Technology, Ventura County Transportation Commission

David Lively, Chief Travel Information Systems, Caltrans Headquarters

Joan Ravier, Program Manager, Westwood One

John Cox, President/CEO, The Partnership

Melanie Crotty, Project Director, Metropolitan Transportation Commission

Hamed Benouar, Executive Director, Center of Commercialization of ITS Technologies

## **Invited Experts:**

Jesse Glazer, FHWA  
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## **PURPOSE OF THE MEETING**

The meeting was convened by the MTA in order to discuss future policy direction with regard to Regional Traveler Information. Advice was sought on the value of traveler information and views on issues associated with the financing of the operation and maintenance of such services. The impetus for this activity was the conclusion of the LA/Ventura Advanced Traveler Information System project. Advice was sought from a panel of experts representing public and private interests in traveler information from throughout the State. The group included the former head of the Los Angeles Department of Transportation; the Director of the METTRANS Transportation Center a research institute of USC; the Director of Technology for Ventura County Transportation Commission (VCTC); the Chief of Travel Information Systems for Caltrans HQ in Sacramento; the President/CEO of the Partnership a SCAG supported agency that brokers traveler information to the media; the Program Manager for Westwood One which owns and operates a variety of traveler information media systems; the MTC Project Director of Advanced Systems Applications for the Bay Area and the Executive Director for the Center for the Commercialization of ITS Technologies, associated with PATH and UC Berkeley.

## **BACKGROUND**

The meeting began with a brief introduction to the background of the discussion. Extensive investments have been made over the past ten years in so-called Intelligent Transportation Systems (ITS). The early investments concentrated on developing electronic means of operating separate agency systems. This led to the development of valuable agency and mode specific data sources that were isolated from each other. More recent efforts have been concentrated on the means of linking these individual data sources for the purposes of supporting interoperability and data exchange. As a result, projects have been directed toward the integration of systems and their data across the region. The traveling public for the most part have had limited access to some of the most valuable information. This meeting therefore concentrated on a discussion of topics related to how to insure that high quality traveler information is made available throughout the region in a cost effective manner.

For the purposes of the discussion a differentiation was made between the three interlocking categories illustrated below. Data collection represents the complete set of sources collected by the regional agencies. The so-called data gateway represents the means by which these sources are brought together and made available either to other operators or the public. Finally dissemination refers to the many forms of media by which information can reach both operators and the public. The focus of the discussion was on the data gateway and its relationship to both the owners and collectors of data and the distributors of the information.

The group was convened to discuss the relative priority of traveler information, share insights and experiences with public and private traveler information initiatives, test the assumptions made by the central Los Angeles/Ventura ATIS project and help find solutions.



## LA/Ventura Region System Integration Efforts

The following represent the stream of projects that have been the incremental building blocks in regional system integration.

- **ITS Strategic Deployment Plan** – defined the elements and the projects and the means by which they could be linked.
- **IMAJINE** - a demonstration of coordinated traffic management between the City of Southgate, Caltrans, the MTA and access services through the implementation of a peer-to-peer network.
- **LA Regional Kernel** – regional services put in place to allow regional coordination and traffic management using the peer-to-peer network.
- **TravelTIP** – an Orange County Advanced Traveler Information System.
- **LA/Ventura ATIS** – a project based on elements of TravelTIP to build an interim network for an Advanced Traveler Information System to collect data from regional sources

(Caltrans, LADOT and MTA) with a single dissemination portal to private Information Service Providers (ISPs).

- **Mode Shift** – an inter-modal public information system development.
- **Regional Integration of ITS (RIITS)** – builds the regional network for regional operations extends the reach of partner agencies to include emergency services and transit operators, ports and airports, creates an architecture and long term maintenance management system. The focus is the exchange of data between operating agencies.

The following are additional regional system integration efforts that are under development.

## Integration System Elements Under Development

- **LA County Department of Public Works, Information Exchange Network** – building interim network to collect data from arterial sources throughout the region. Will connect to the regional network.
- **ATSAC/ATMS Santa Monica Smart Corridor Integration project** – a project to make the exchange of data between Caltrans and LADOT ATSAC possible via the Intertie Server.

The following are the current agency based traveler information systems for Los Angeles/Ventura Counties.

### Current LA/Ventura Agency Information Systems

- **MTA ATMS** – a transit management system in the process of being deployed. A RIITS interface will be developed to disseminate the information to other operators.
- **Trip Planner** – an existing system with web page and telephone based system in the process of being expanded and updated with plans to include real time data from RIITS and other sources.
- **Rideshare** – a new regional initiative to replace the SCAG TranStar system.
- **GoVentura** – an existing system with web and telephone based systems gives complete transit, traffic (to the limited extent of availability) and bike route information and includes a trip planner.
- **City of Los Angeles TrafficInfo** – a website with City arterial traffic congestion information and displays.
- **SCAG** –Commuter Services website and telephone based traveler information service. This includes, trip planning using TranStar, rideshare and transit information. There is no provision for real-time data.

### System Demonstrations

Both the Los Angeles/Ventura ATIS and RIITS web pages were demonstrated. Los Angeles Ventura ATIS is not currently available to the public. This is the focus of the discussion on a business plan in support of the gateway. The web page includes traffic conditions down to the level of detail of segments of the HOV lanes as well as average speeds on both freeways and LADOT arterials. The RIITS web page at [www.riits.net](http://www.riits.net) has been developed as an outreach tool for the agencies and is currently available to the public. It represents the latest generation of data display. It includes both examples of streaming video and snapshots taken from Caltrans freeway cameras and active messages on the CMS signs. Neither the camera or CMS data are currently available from other sources. The incident information is drawn from Caltrans District 7 ATMS and represents confirmed incident information that Caltrans operators are monitoring for traffic impacts. This information differs from the CHP log information available to the media in that it is filtered to represent only information considered to impact freeway flow.

## Los Angeles/Ventura ATIS Gateway Deliberations

### Project Working Assumptions

- It was assumed necessary to create a public/private partnership. In which the public agencies should concentrate on system management and high quality data collection. The private sector ISPs should do what they do best i.e. the delivery of the information.

### Project Objectives

- Create a single point connection for ISPs;
- Give access to data in standard format;
- Learn from previous experience with such initiatives nationwide;
- Provide multi-modal pre-trip, en-route and route guidance information; and,
- Develop an acceptable business plan.

### Testing the Objectives

- ISPs confirmed the single point connection;
- The preferred standard format was identified as XML; and
- Interviews with ISPs revealed experience nationwide and identified market problems with public acceptance of subscription services, heavy competition in the markets, high front end costs and limited revenue sources i.e. public funding, subscription & advertising.

### Business Plan Alternatives

The following represent the three outline models considered, all of which are capable of having multiple variants.

#### Public Private Partnership

The model features are:

1. Structure
  - Contract with a private partner to manage consolidation of data and dissemination of the information
2. Contract Administration
  - Contract to be managed by MTA
3. Startup Funding
  - Some startup subsidy needed but includes some private sector investment
  - The market for this model not expected to be sufficient to be sustainable
4. Operations and Maintenance
  - An unresolved issue for all models

#### Private Broker Partnership

The model features are:

1. Structure

- Establishes a brokerage that takes on all business responsibilities and contracts

2. Contract Administration

- Handled by broker
- Effectively leaves little control for the public partners

3. Startup Funding

- Some startup subsidy needed but includes some private sector investment

4. Operations and Maintenance

- Relies on market based revenue production
- If revenues prove inadequate it becomes an unresolved issue as for other models

## **Public Public Partnership**

The model features are:

1. Structure

- A publicly managed and controlled project

2. Contract Administration

- Public agency responsible for all administration and oversight relating to data dissemination

3. Startup Funding

- Requires startup subsidy

4. Operations and Maintenance

- An unresolved issue as for the other models but assumes information made available to ISPs free of charge with no revenue sharing

### **Selection of the Public Public Model**

The stakeholder group selected the Public Public Model for the following reasons:

- Stakeholder consensus,
- Opportunities for agency identity and control,
- Direct startup did not involve negotiating with other partners,
- Later migration to other alternatives was possible, and
- Not reliant on doubtful ISP economics.

The issue of how this public sector initiative could be funded was left open.

## **PANEL DISCUSSION**

The discussion was loosely organized around six issues, which represented issues that have arisen in the course of the LA/Ventura ATIS project. The discussion has been summarized and does not represent a verbatim report. For the purposes of brevity remarks are not attributed to particular individuals. Every effort has been made to capture all of the central comments that were made.

### **Issue 1**

“The Los Angeles/Ventura ATIS Project was begun in a period of great expectation for the value of the dissemination of traveler information to the public. Should this still be considered a regional priority in a period of austerity and lack of public resources?”

One point of view was that there is clear value in establishing a single point of connection from the point of view of coordination and efficiency. Agencies have a mission to maintain mobility and traveler information is a component for supporting this that translates to agency cost savings. Easing congestion on the streets allows buses to run more efficiently thereby improving mobility.

Another view was that it is important to distinguish between commercial and non-commercial interests with no reason to pay to support what a private company would do anyway to support its own commercial interests. There is a need to answer the question what is the information supposed to do?

An alternative media viewpoint was that their contribution in disseminating information to the public represented a real contribution to improved traffic management and should be further supported by the agencies. Further, identifying the sources of information makes good public relations sense helping with future funding approvals by showing the valuable use of tax dollars by the various agencies.

It was commented that indeed transportation agencies have responsibility for managing traffic and congestion and addressing the issue of demand. There is value in getting data to the traveler since road capacity is not growing and efficient use of the existing transportation system is essential. There is a need to take responsibility for distributing information about the ever-increasing impacts of special events on the transportation system. Emergency events have more than proven the need for and importance of being able to get information out to the public in times of emergency such as the evacuation of the city on 9/11 and the 36-hour period of closure of access to LAX airport (the LADOT site had 1.3 million hits). There is also importance in the "Assurance Value" that the public sector can provide through providing their own dissemination services for use in times of emergency. In such circumstances such information is perceived as trustworthy.

An alternative view from the private sector was that the discussion was out of context with today's reality. Six ISPs are already doing what is being discussed and real time information on traffic and congestion is being delivered. An example of this is Smart Station KABC/Channel 7, which is on the air with similar maps. The fundamental problem is getting accurate data from the system in LA and Ventura. Route 210 extension has no traffic sensors and neither does the 710 both of which are strategically important routes. The Inland Empire by comparison has approximately 300-400 vehicle detectors. The central priority should be seen as data accuracy and getting access to the data. Currently there is no ISP access to the LADOT arterial data.

This led to an explanation of the problem that LADOT has faced with the City Attorney's Office and the strict need for respect of the City-wide ban on advertising. Traffic data with the ATSAC attribution cannot be associated with commercial advertising. The LADOT web site was being scraped by several web sites who were then framing the information in advertising. It was concluded that the problem of agency concern for their data being associated with inappropriate advertising is essentially a non-issue if data are disseminated from one central source and no longer need to be scraped from agency web sites. If LADOT data were made available through an MTA website without a specific ATSAC attribution this would resolve the problem. An alternative recommended solution was to copyright individual agency websites.

The discussion reverted to the question of timeliness and accuracy in data delivery. The current means by which Caltrans data is accessed from the PEMS central system at Berkeley means that the delays in transfer deliver outdated information ( 15 minutes old). (A later clarification of this point indicated that data coming directly from the ATMS to RIITS has far less delay associated with it.) Others concurred that accurate comprehensive data should be a priority.

The gaps in information often reflect the lack of priority for ITS investments. There were several comments indicating that ITS needs to be written into every project and it then needs to be built into the projects. The public agencies have to be involved in the grant writing. A good example is

Ventura County where a number of freeway projects were underway without suitable ITS provisions. VCTC was able to mandate that fiber conduit would be included in design and construction on the 23 and Simi Valley freeway. Funding influence now makes this possible.

A different perspective described 511 as the public face of ITS. Means of implementing it should be found. Web and telephone based information should be public services. (Note: 511 a federally designated telephone number is for the provision of traveler information. There is no federal funding for this service. There are reportedly 18 regions within the USA that have now committed to provide telephone based traveler information through 511.) This discussion extended into the manner in which ITS and long-term maintenance need to be written into every project so that it is simply a core element.

Returning to the central issue of whether traveler information should be a regional priority, the MTC made clear that the Bay Area believes that traveler information helps them maintain and balance their system. The baseline elements (please specify) will be continuously supported. Other elements are more likely to be required to offer proof of benefit to be continued in the long term. There are those that believe that the case has been well made for the regional importance of publicly supported traveler information for managing demand for mobility and supporting actions when security threats arise. In addition making information available concerning the ever-increasing number of special events will continue to be of importance. The 511 voice-activated telephone system is seen as a key element supported by web pages.

The public sector believes that information should be provided for free, as directly as possible and should make all information available.

## Issue 2

“An issue encountered in the course of the project is the reluctance of agencies to make data freely available to Independent Service Providers who may attach uncontrolled advertising to the reprocessed data when sold. Have other agencies/regions encountered this problem? How is it being managed elsewhere? Are there answers to this problem?”

It was explained that the issue with LADOT was really a billboard issue that the council policy was directed toward controlling. There is no advertising allowed at bus stops or on city owned buses. It seems that this issue could be dealt with through consolidating all the data sources together under the umbrella of the MTA so LADOT data are not specifically identified. LADOT's own website could appropriately have public service and safety focused advertising and gives the opportunity for staff to take credit for the quality of the system they have established.

It was commented that some governmental agencies elsewhere have been anxious for the media to give credit to the origins of their data and encourage media reference to this. In addition the public can be directed to the original source for more in-depth information. Amber alerts are an example of this cross- referencing between media and the agencies where the in-depth information can be made available from the originating agencies.

One comment was that ISP information dissemination and agency dissemination should be seen as complimentary not competing services. The MTC recognizes the closeness of the relationship and requires ISPs to feed back information on overall use of the services with agency supplied traveler information. Access to this measure of benefit can reflect credit on the government agencies involved.

Giving original data feeds to the ISPs gets away from the scraping issue and the mixing of original ownership and advertising. It makes this a non-issue. Copyright your own website was the advice given by some.



### Issue 3

“Are the project team members correct in believing that in today’s economic climate and for some time in the future, public resources are required to support public traveler information interfaces”.

The MTA staff described the Trip Planner history and current developments. The program has a long history and was begun in 1979 when the MTA hired a programmer who built the system on a main frame computer. The initiative competed with TranStar but both are effective. The program has most recently received additional funding to modify the application on a PC-based system for regional Applications. This funds major changes that allow:

- MTA to get out of proprietary code;
- Develop an open source model;
- Intent is to create a product that adheres to National Standards;
- XML is the format of choice that can be translated to any interface;
- A real time component is to be added (incidents);
- External agencies are interested in having one look and feel;
- The mission is reducing costs, sharing costs, getting people out of cars and using transit; and,
- One idea for reducing long-term costs is to share costs across other economic interests along the line of the “Sabre System” developed by the airlines. A complex system is brokered to other users with different services. Such services might be the addition of hotel, travel, entertainment, retail sites and restaurant information.

Sharing operational costs amongst a number of ISPs was one formula suggested. This was tempered by a comment that sometimes such agreements amongst ISPs are more trouble than they are worth.

There are still two elements of two different services to consider. The public-to-public operator information exchange for traffic management purposes should certainly be publicly supported. Maintaining video links is not a trivial task. The output report only represents a small incremental cost.

It was argued that there needs to be support for one centralized concentration point with one standard interface.

If safety, efficiency and economy are central to the MTA mission then social justice equates with the public good of supporting O & M for ITS.

It is time for agencies to recognize ITS elements as new core services that require a different view of ITS deployments as they go forward. Providing traveler information is a part of the core mission of a public agency.

Certainly the MTC has established leadership to provide traveler information throughout the nine-county region. The MTC as the MPO, holds back funding from mixed sources, in order to give priority to this project of regional significance. VCTC does the same thing on a smaller scale. Eighteen regions within the USA have now committed support to 511. The Bay Area and San Diego are the two examples within California.

### Issue 4

“If the widest possible dissemination of traveler information is considered a regional strategic priority are web based dissemination methods the most cost effective strategy if supported by existing telephone based services for those without Internet access”.

One response to this statement suggested that it's the other way around in priority. Telephone and media based systems are supported by the web.

A contrasting comment was that websites should not be overlooked as a valuable means of outreach to politicians as well as the public. They are an easy and cost effective means of making the point to elected officials and helping them to support these strategies.

#### Issue 5

"How can the needs of ISPs for filtered i.e. manageable data sources be funded by public agencies"?

There were differences of view as to what constituted filtered data. (The intent had been to refer to the avalanche of data from the central source being reduced to manageable and useable proportions). There were those who felt that there should be some form of resolution of conflicting data sources before they were made available and those who were happy to have multiple data sources and resolve the conflicts themselves.

The conclusion of the discussion from the ISP perspective was that they would be content to perform the data fusion.

#### Issue 6

"Free service vs. Fee-based service. How should we go about it? What are the major issues related to either type of service?"

This issue led to a discussion of evaluating customer use of information services. Customer satisfaction is the subject of on-going research. The Volpe Institute has recently published their latest findings with regard to web based Traffic Information Services in Los Angeles and Seattle.

The wider question of measuring the effectiveness of these services is hard to resolve. Effects are hard to measure and subject to many confounding external effects. Broad forms of measurement, such as monitoring the incidence of repeat callers, are one indicator that can be used. Following up with targeted surveys is not considered advisable.

## Endnotes/References

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<sup>1</sup> ISTEA requires that “operational tests utilizing federal funds have a written evaluation of the Intelligent Vehicle Highway Systems technologies investigated and the results of the investigation.” Although Showcase is not officially an operational test, it deploys and demonstrates ITS services, functions, and technologies under “real world” conditions, similar to an operational test.

<sup>2</sup> California Statistical Abstract, Table B-4. California Department of Finance, Sacramento, CA. October 2001.

<sup>3</sup> California Statistical Abstract, Table J-4. California Department of Finance, Sacramento, CA. October 2001.

<sup>4</sup> The total project budget numbers are accurate and come from the project contract (LACMTA PS-4340-0337) and its amendments. Individual task budgets were estimated based on approximations provided by NET.